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A SERIES OF PUBLICATIONS RELATING TO THE AMERICAN ABORIGINES

THE CAYAPA INDIANS OF ECUADOR

BY

S. A. BARRETT

PART II

NEW YORK
MUSEUM OF THE AMERICAN INDIAN
HEYE FOUNDATION
1925

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THE CAYAPA INDIANS OF ECUADOR

BY

S. A. BARRETT

PART II

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THE CAYAPA INDIANS OF ECUADOR

By S. A. Barrett

MANUFACTURES—*Continued*

Textile Arts

THE Cayapa weave many useful articles from the native materials that abound in their territory. These objects comprise various types of basketry, one type each of fan, mat, cloth, and three of nets. Their finest textile work is the cloth woven from cotton and wool in elaborate patterns. The only other decorated textiles are fans, mats, and a few types of baskets. This class of decoration is due largely to the materials and to the technic of the articles manufactured, all of which are made from strips of the bark of one or another of five endogenous plants. These strips have different natural colors on their two surfaces, and by bringing their light or their dark sides uppermost, simple geometric patterns alone are worked out without further coloring. Such technic makes possible only a limited number of patterns, as has been pointed out by Dr. Max Schmidt.[14]

[14] Indianerstudien in Zentralbrasilien, Berlin, 1905. Besondere Geflechtsart der Indianer im Ucayaligebeit, *Archiv für Anthropologie*, N. F., VI, H. 4, 270–281. Braunschweig, 1907.

BASKETRY

Cayapa basketry may be classified according to the materials from which it is made, its technic, and its forms and uses.

Classification according to materials is recognized by the Cayapa themselves, as is shown by the following terms:

Materials

Pitigua = te'tcūa (the root of an aerophitic plant); te'tcūm pickalyī = basket made of te'tcūa.
Rampile = pī'tcūa (a species of palm); pi'tcūm pickalyī = basket made of rampile.
Hoja blanca = fī'ba hakī; fī'bañ pickalyī = basket made of hoja blanca.
Hoja negra = e'lūñ hakī; e'lūñ pickalyī = basket made of hoja negra.
Chocolatilla = tcōkōla'*t*e; tcōkōla'te pickalyī = basket made of chocolatilla.
Crinande = viñga'tcī; viñga' pickalyī = basket made of crinande.
Hoja de chapil = kūla'hakī; dīc-pūnūntsū'mī; kūla' pickalyī, kūla'pō pickalyī = basket made of hoja de chapil.

The word picka'lyī, which strictly signifies any kind of basket other than the burden-basket or the hamper-shape basket, is here used as a general term meaning baskets of all kinds. All considerations of technic, form, and use are omitted in the above classification, material only being taken into account.

The basket materials used by the Cayapa may be divided into three classes. First, the heavy strips or splints of the inner fibers of the aerial root called pitigua, used for making the more durable baskets such as those shown in pl. XCII, 1, 3, 4, 6–8, and in pl. XCIII, 1, 3, 4, 12.

In the second class of material may be included the thin bark of five species of endogenous plants: rampile, hoja blanca, hoja negra, chocolatilla, and crinande, which are used for making the lighter and less durable baskets, especially the hamper-shape baskets such as those shown in pl. XCIII, 2, 5, 6, 10, 11, as well as diminutive trinket baskets like those in figs. 15–17 (pp. 200-201). These materials, especially rampile, are used also in making baskets of other forms, but requiring no great durability or strength. Baskets of this class are shown in figs. 7–9 of pl. XCIII. Rampile is also extensively employed in making fans and mats. In the third class of materials is the leaf of the palm known in Spanish as chapil, sometimes also called milpeso, and, by the Cayapa, kūla′pō. Two forms of basket, one conical, the other square-sided (pl. XCII, 2, 5 respectively), are made of this material. Such baskets are suitable only for temporary use, since after a day or two the material becomes dry and brittle; while green, however, it is pliable and fairly strong. The conical basket (fig. 2) serves a ceremonial as well as a utilitarian purpose, being employed by shamans in their medicine practices.

The most important of the various basketry materials is the pitigua. This durable fiber is derived from the long roots of a single species of aerophitic plant which usually grows in the upper branches of trees and sends its long, slender roots to the ground. Pitigua is much sought for various purposes by the negroes and whites of the region, as well as by the Indians, so that along the lower course of the Rio Cayapas it has become somewhat scarce. When the plant is found, however, its roots are

easily gathered, since by simply pulling on them they usually break off at or near the plant itself, and often a root seventy-five or even a hundred feet in length is obtained. It is employed not only for basket-making but for many other purposes, such as for binding together the parts of a house-frame (figs. 2–5), for binding the palm-leaf thatch upon the roof (pl. VII), and indeed wherever material for tying or binding is needed. It serves also the many purposes for which civilized people use string and rope, as for mooring canoes, securing animals, etc. Pitigua fiber is practically indestructible so far as dampness is concerned, and may even be kept wet for a considerable time without rotting. If kept from direct contact with water, however, it will last for years even in this humid climate, as is shown by the bindings on the frames of some of the Cayapa houses that have been in use for ten or fifteen years at least.

When gathered these roots are usually made up into large coils (pl. XCI, 4) and laid away in a dry place until needed. To render them pliable they are soaked over night in the river. In two forms of baskets the warp elements are made of the smaller whole roots of the pitigua, otherwise the material is always split into strips or splints, which are prepared as follows:

The bark of the root being first removed, its inner woody portion is split into long, thin ribbons. The individual fibers of the root are extremely long and straight, hence when once started a ribbon can be split the full length of the root with almost perfect evenness. Usually one end of the root is taken up and split with a knife or machete, for a distance of an inch or two, into

ROPE COILS AND BRUSHES

BASKETS OF PITIGUA AND CHAPIL

as many strips as it will yield. This split end is then grasped with the left hand at a point five or six inches from the cuts described, and is bent with the right hand down over the thumb of the left, or in the opposite direction over the fingers (fig. 14). This tension on the fibers causes them to cleave uniformly along the planes started by the preliminary splitting. A new hold is then taken farther down and the bending repeated, which results in the splitting of another section. In this manner it is possible to split rapidly a long root throughout its length. A root will sometimes yield as many as half a dozen strips suitable for basket-making. Before these are used, however, any rough or uneven places, due to chance cleavage of the fibers along these planes, are removed by scraping and sizing.

Fig. 14 —Splitting pitigua for basketry

The scraping is done by holding vertically to the ribbon a knife or other sharp-edged instrument while the ribbon is drawn over the edge of the heel or across the side of the knee. Obviously the width of such strips varies according to the part of the root from which they come. On the other hand, the root differs so slightly in diameter throughout that the variation in the width of a strip is very slight. For the finer basketry all splints are

trimmed to approximately equal widths, but for ordinary baskets this is not deemed necessary.

In case the pitigua root is not available, there are other parasitic plants which send aerial roots to the ground that may be used for temporary baskets.

Of the less durable and lighter materials used for making hamper-shape baskets, the most important is rampile, which comes from the bark of the petiole of a fan-leaf palm which produces thin strips from one-eighth to one-half inch in width and from three to twelve feet in length. In splitting off this bark, the circumference of the end of the stem is cut with a sharp instrument into as many segments as the desired width of the strips demands. Usually the strips on several stems are started at one time and then the bark of each is split off by pulling with the fingers one strip after another. In splitting the bark in this manner, a certain amount of the inner succulent fiber of the stem is taken with it. To remove this a number of strips, perhaps twenty, are grasped between the great and second toe in such manner that one end of the bunch of strips reaches almost to the body. Thus held, the strips are taken in turn and the succulent portions cut transversely at a point a couple of inches from the end. The strips are now taken rapidly one by one and the bark is peeled from the succulent fibers. It remains only to size the strips, that is, to bring them to an even width. This is done by splitting, since in this material, as in the pitigua, the fibers are long and straight, so that when once started they part evenly the full length of the strip. It is rarely necessary to do any special cutting and trimming to make these strips of proper widths.

The material of this class next in importance to the rampile is that obtained from the petiole of the hoja blanca, called by the Cayapa fī'ba hakī, signifying, as does the Spanish term, "white leaf." This plant has a long pinnate leaf somewhat similar to that of the banana, but with a long, round, slender, and fairly hard petiole. It derives its name from the fact that the under-surface of the leaf-blade has a thick coating of white bloom. The strips of this material used in basket-making are obtained from the petiole of the leaf in the same manner as are those of the rampile, except that before splitting off the bark it is scraped. This removes a thin, succulent outer coat of light-green, and leaves the inner creamy-white bark which is hard and tough, though very thin. This hoja blanca bark is used chiefly for making small hamper-shape baskets (figs. 15–17) used as receptacles for trinkets, though it is frequently employed in making fans, especially the finer ones. It is much less durable than is the rampile, and for that reason, as also on account of its thinness, it is not adapted to the manufacture of large hampers or of mats.

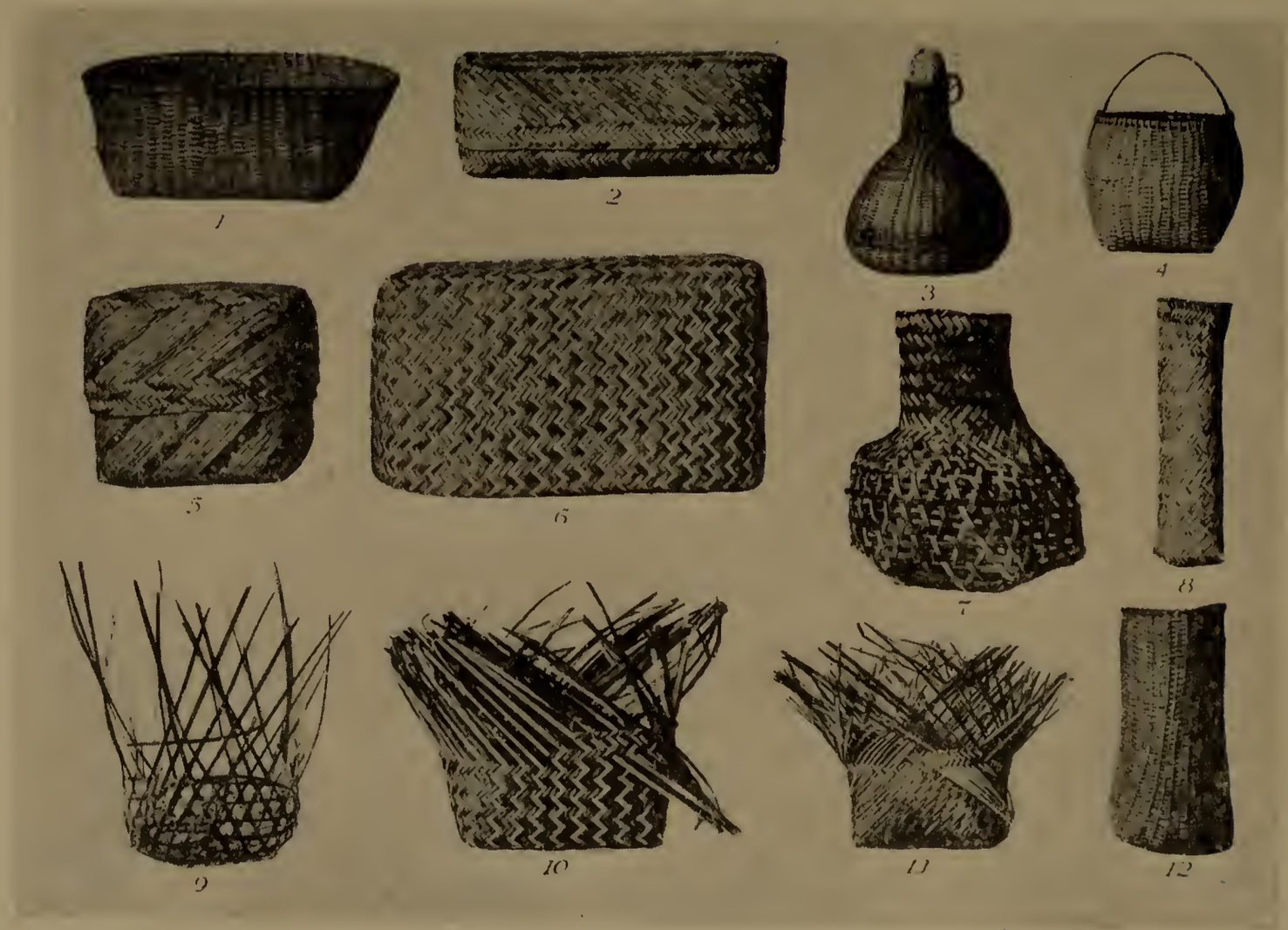
The blades of the leaves of hoja blanca find a variety of uses, chief among which is as a covering for cargoes of canoes to protect them against rain. The leaves are much tougher than are those of most plants of a similar kind in this region and shed water perfectly. They are used even for repairing leaks in house-thatch, though they are never employed for entirely thatching a permanent building.

Hoja blanca is the only basket material which is ever artificially colored. The strips are stained with red

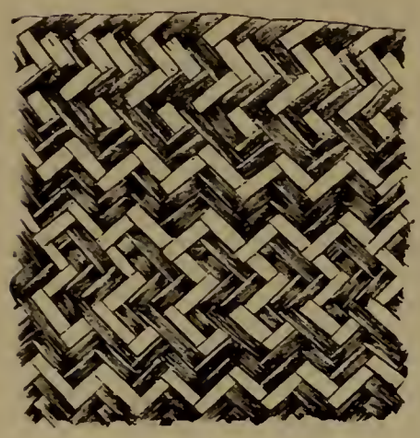
achote, the plant which produces the red face-paint used by the Cayapa. This coloring matter is rubbed on the stem after it has been scraped down to the hard white layer of the bark and before the bark is stripped from the stem. The colored strips are used occasionally as a means of producing the geometric designs used in small hamper-shape baskets and in fans.

Three other plants with a habit of growth similar to that of the hoja blanca occasionally furnish materials for the hamper-shape baskets. They are the chocolatilla, called by the Cayapa tcōkōla'*t*e, which yields a brown material; the hoja negra, called e'lūñ hakī; and the crinande, called viñga'tcī. The material in each of these plants comes from the petioles of the leaves. They are obtained and manipulated in the same manner as is that derived from the hoja blanca. None of the three, however, is ever colored.

As above mentioned, the leaf of a large species of palm, called in Spanish chapil, is used on rare occasions for basket-making. Should a person be out hunting, or for any other reason be at a considerable distance from his house and unexpectedly find some fruit or other commodity which he cares to take home, he may, by securing a couple of the large leaves of the chapil, quickly fashion a temporary burden-basket, such as either of those shown in pl. XCII, 2, 5, in which to carry them. Such a basket is never kept for further use, for as soon as the leaves become dry they are very brittle and entirely worthless.



LIGHT BASKETS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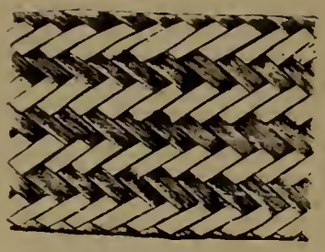
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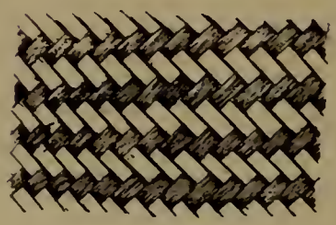
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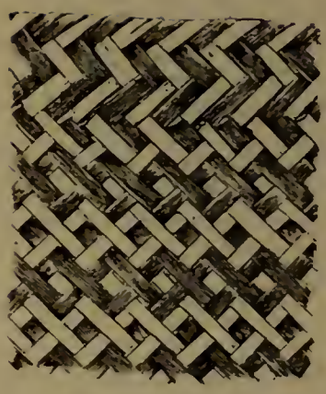
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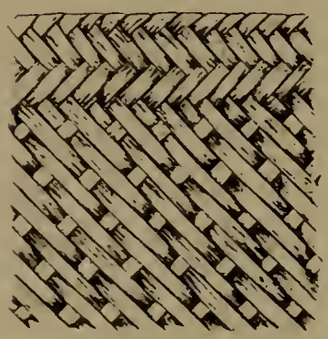
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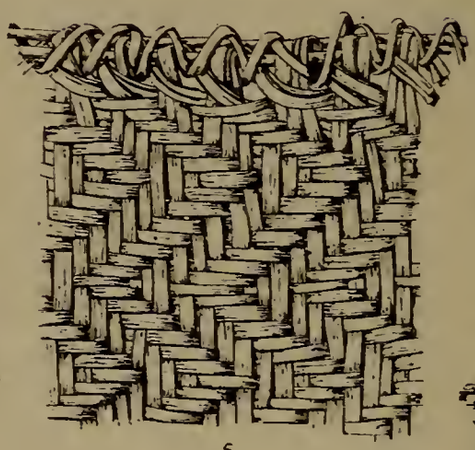
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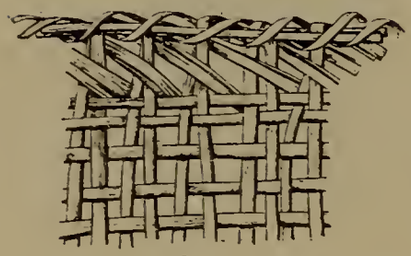
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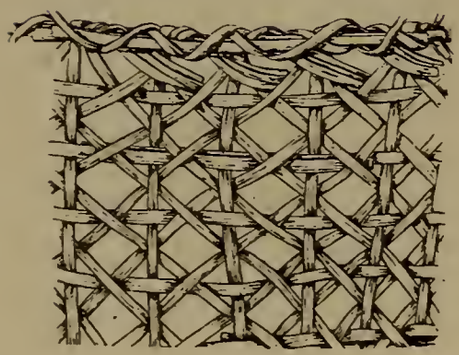
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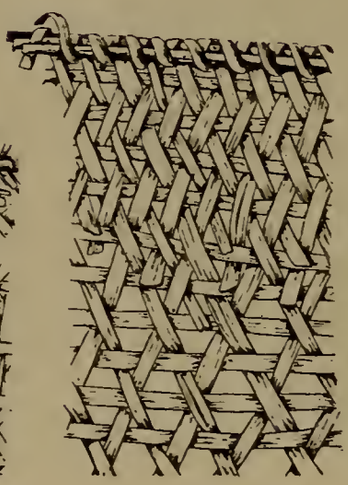
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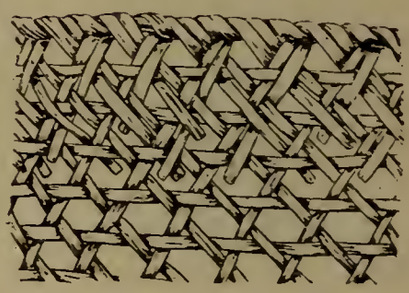
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BASKETRY TECHNICS

Technic

From the standpoint of technic, Cayapa basketry may be divided into three general classes according to the number of elements used in the construction, as follows:

Two-element work:
- Wickerwork—kūtse'ka (pl. XCII, 4, 7; XCIII, 1, 3, 4, 12; XCIV, 7; XCV, 1, 2, 5).
- Twilling—kapē'a, yē'ī or ya'iyi (pl. XCIII, 2, 5, 6, 8, 10, 11; XCIV, 1–6; XCV, 3, 7).

Three-element work:
- ka'pū (pl. XCIV, 6, 8, 12).
- tcī'nde (pl. XCIV, 11; XCV, 4, 8, 10, 12–14).
- dō (pl. XCV, 6, 16).

Four-element work:
- ba'ndilas (pl. XCII, 3; XCIV, 10; XCV, 9, 11).

In addition to these technics, which may be considered the regular Cayapa basketry technics, there are two others used in the two types of palm-leaf basketry made by the Cayapa and illustrated in pl. XCII, 2, 5. In the first instance the technic bears a resemblance to checkerwork, while in the second it is based on the same kind of manipulation which in cordage is known as the "half-hitch."

Neither twining nor coiling is used, and the same may almost be said of checkerwork, although there is one form of basket, the bottle-shape bait basket (pl. XCIII, 3), which has on its bottom a technic somewhat resembling checker (pl. XCV, 2). In this case several splints are used to form a wide unit element, and it cannot be strictly called checkerwork, but is rather wickerwork in which several splints instead of one are employed as a unit. In some specimens the resemblance to checker-

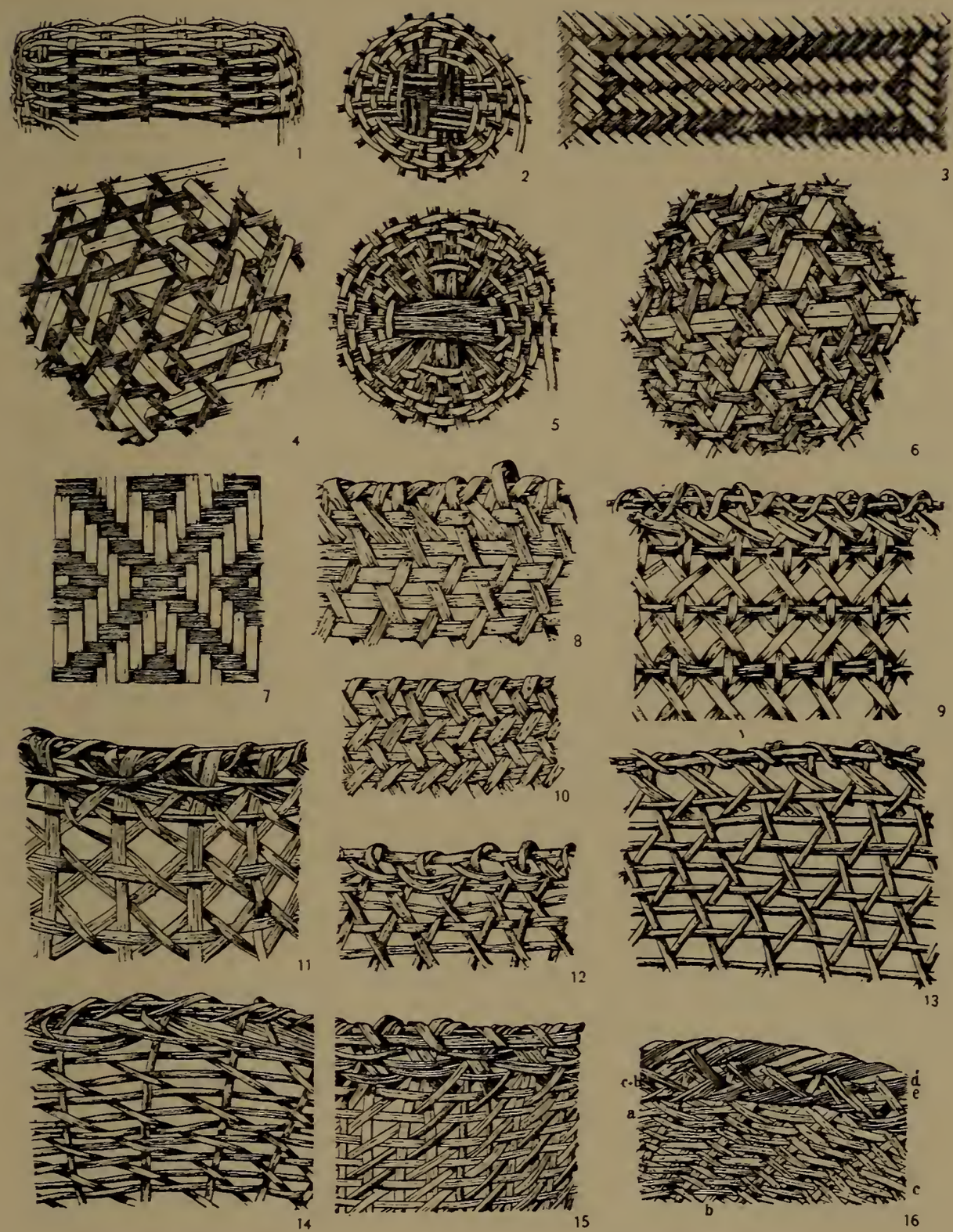
work is still more apparent than in the one here referred to, because these composite, wide elements are made to pass under and over one another several times instead of only once. This process is never employed except at the starting point of this form of basket.

In detail the technics employed by the Cayapa in their basketry are as described below. Further, in addition to its use in basketry, twilling is employed in making mats and fans, and wicker is used in certain burden-bands and in fan-handles.

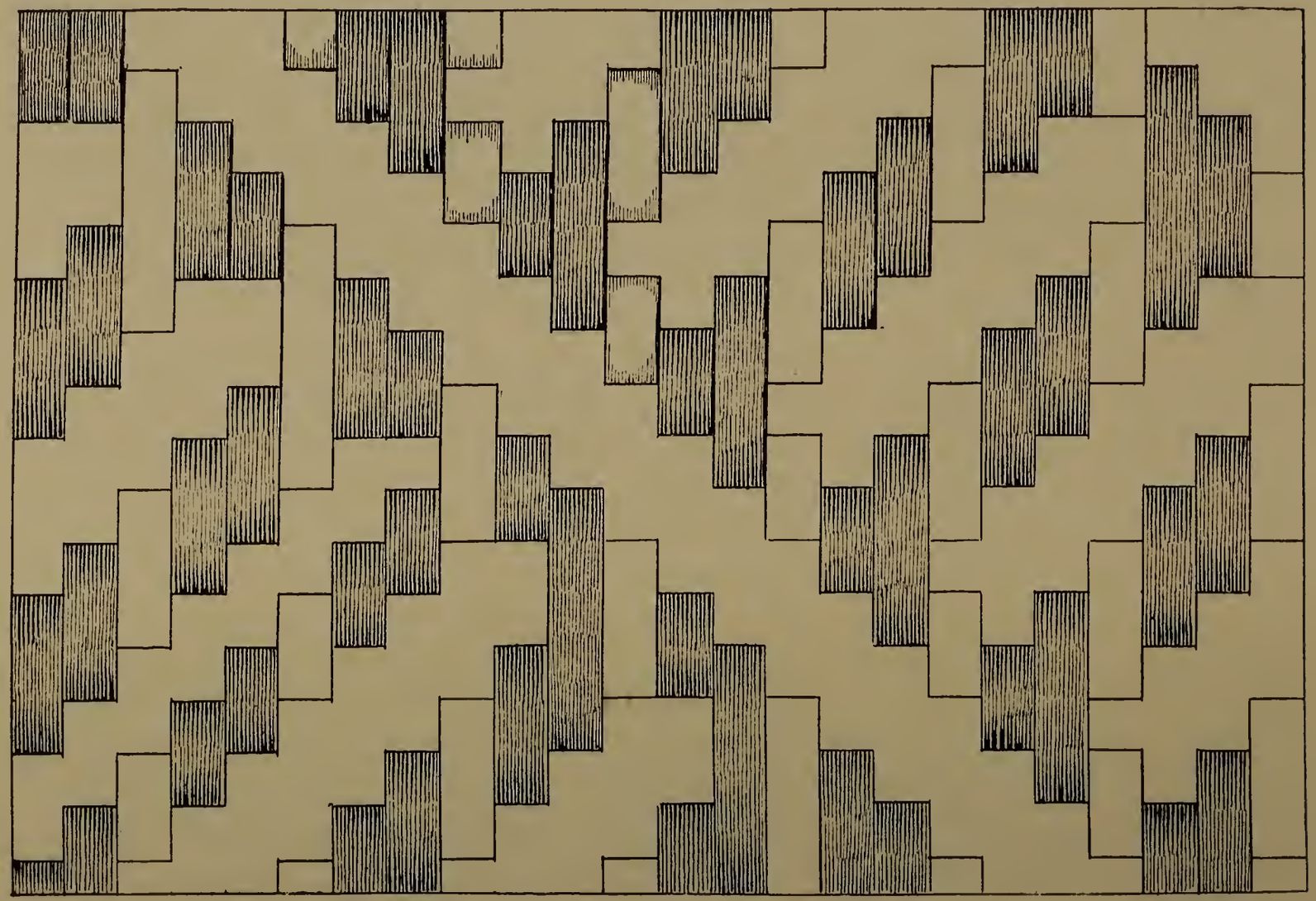
WICKERWORK

Wickerwork, the simplest of the two-element technics, consists of the passing of a single active or woof element over and under successive passive or warp elements. The Cayapa employ this technic almost solely in connection with the material derived from the aerial root called pitigua and for the making of five forms of basketry: a burden-basket, a shallow rectangular basket, a bottle-shape bait basket, a more or less globose basket used in carrying fruits and as a general household utensil, and a long tubular basket used especially as a receptacle for spindles. Examples of burden-baskets are shown in pl. XCII, 4, 7, while the other forms are illustrated respectively in pl. XCIII, 1, 3, 4, 12.

Ordinarily the Cayapa wickerwork is comparatively tightly woven, as is shown in illustrations referred to. There are, however, two special types of wicker basket which are open in their technic. Both are made for the purpose of allowing water to pass readily through them, being used especially as cages for live crayfish which are

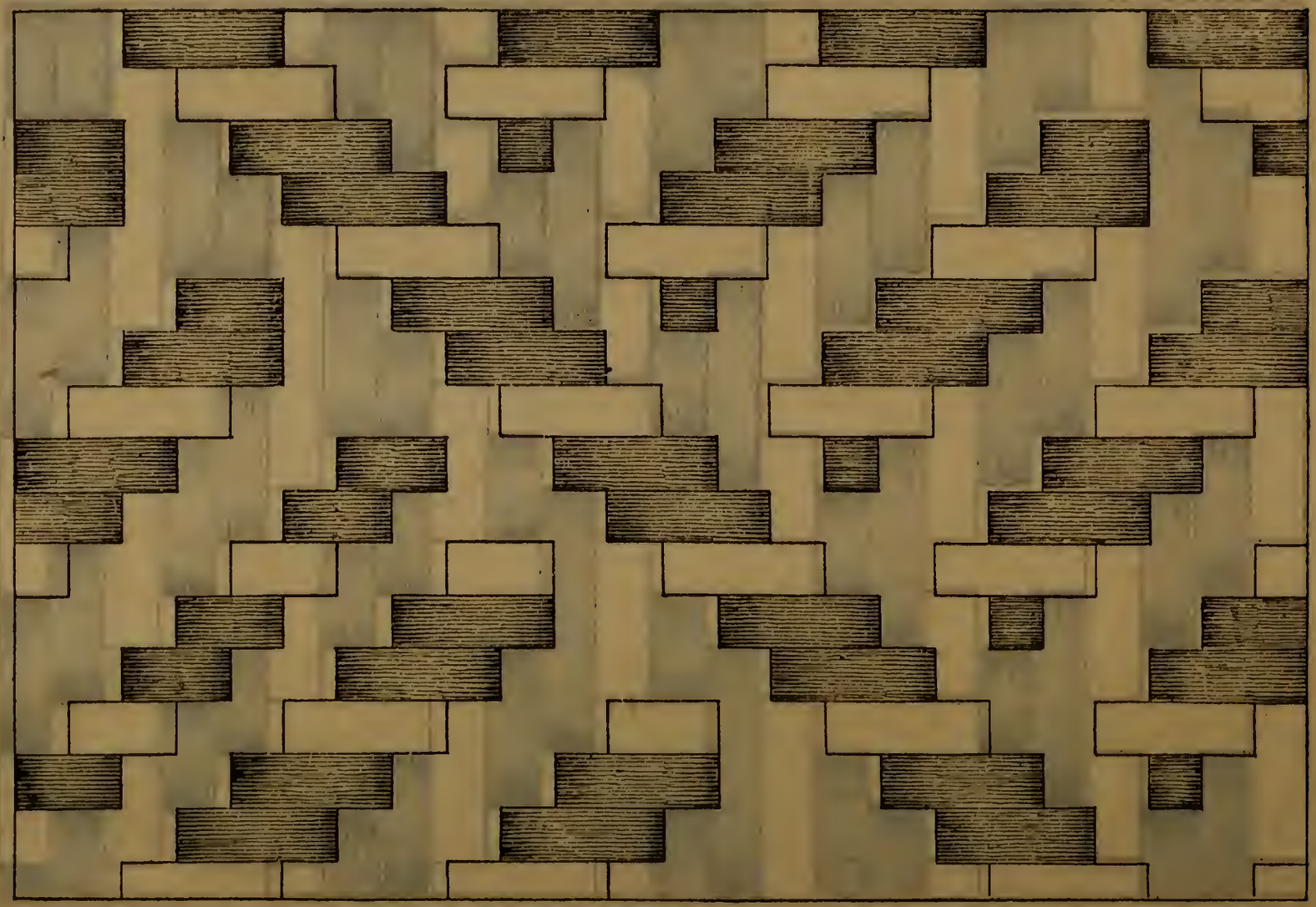


BASKETRY TECHNICS



ELEMENTS OF A DESIGN IN TWILLED BASKETRY

wood splint crosses the last of the warp elements at one edge forms the turning point for the first weft splint. This is turned directly back in a kind of loop and is passed parallel to itself but in the opposite direction, and



ELEMENTS OF A DESIGN IN TWILLED BASKETRY

thus kept in the river until required for food. Both of these open types are similar in form to that shown in pl. XCIII, 4, and one of them has tightly woven sides identical to those of the basket shown in this figure, but has what may be termed an open-work wicker bottom. The other has open-work sides as well as bottom. A portion of one of these sides near its upper edge is shown in pl. XCIV, 8. This openness is produced by the simple device of spreading the elements apart so as to leave openings or meshes of the desired dimensions. In the one with the open-work flat bottom only, these openings or meshes are produced by the omission from this portion of the basket of the long, continuous active element which goes back and forth in the ordinary tightly woven wicker basket alternating with the shorter active elements which are later turned up to form the sides of the basket.

The rectangular bottom of the tightly woven wicker basket deserves special attention on account of the particular technic involved. In making such a rectangular base, the details of which are shown in pl. XCV, 1, several parallel splints are first laid down to form the warp elements. One end of a very long woof element is next passed over and under alternate ones of these. A second and very much shorter woof splint is next placed parallel to the first and is so inserted as to pass over and under the warp splints in an order the reverse of that of the first woof splint. The point at which this second woof splint crosses the last of the warp elements at one edge forms the turning point for the first woof splint. This is turned directly back in a kind of loop and is passed parallel to itself but in the opposite direction, and

over and under the elements of the warp. It crosses these in the same order which it first took and in the reverse order to that in which the second woof element crossed them. Thus, up to this point, the original set of parallel warp elements has been crossed three times, twice by this long, continuous element, and once by an ordinary, short woof element which later turns up at its two ends to form part of the sides of the basket. This long, continuous woof element having now reached the side of the basket from which it started, a second short element is inserted. This element, which makes the fourth woof to cross the warp elements, is manipulated in exactly the same manner as was the second. The long, continuous woof element again reverses its direction by means of a turn about the end of the second short element just mentioned and passes back, in the same manner as before, in and out among the warp elements and, reaching the opposite side of the set, again reverses its direction and again passes back to the opposite side of the basket, there being of course previously inserted a third short woof element. Thus, by means of this long, continuous splint which passes back and forth in serpentine fashion across the bottom of the basket in such manner as to include between the sides of each loop an ordinary short woof element which later turns up to form the sides of the basket, a rectangular bottom is produced. The lengths of the sides of this rectangle are governed by the size of the basket desired, but in every case the rectangle is longest in the direction in which the continuous woof splint is running.

By the nature of this technic the spacing of the warp

elements on a long side of the basket is much wider than that on a short side or end, and it would appear that in this fact lies perhaps an explanation for the use of the long, continuous, serpentine woof element. If all the woof elements were short ones whose ends turned up to form warp elements at the ends of the basket, the number of these warp elements would be far too great for practical use. By the insertion, on the other hand, of this continuous woof element, the number of these warp elements is reduced by half and the spaces between adjacent warp elements increased sufficiently to permit the woof elements on the sides of the basket to pass in and out among them with ease. As it is, the warp elements on the ends of the basket are considerably closer together than are those on the sides, so that the number of these elements at each end of the basket is somewhat greater than that at each side, although the sides are considerably longer than the ends.

In all baskets made in this technic, except the one with the open-work sides as well as bottom, the borders are finished by a simple looping over of the warp elements, as shown in pl. XCIV, 7. The method of manufacture of a Cayapa wicker burden-basket, and especially the method of finishing the border, is shown in pl. XCII, 4. Such a basket is made over another burden-basket as a foundation and to give it its correct size and form. As the basket nears completion, each warp element, which until now has projected upward, is bent over, sometimes inward and sometimes outward, and brought down along itself and caught by the woof elements as they pass in and out among the warp. This produces a series of large

loops which project upward and replace the simple warp elements. These loops now become the warp elements, and each is used as a unit in the weaving which proceeds as before until the extreme edge is reached. Here from one to three rounds of pitigua, usually unsplit, are passed through the loops themselves and around the whole opening of the basket. The loops up to this point are quite large and project loosely above the woven portion of the basket, as shown in pl. XCII, 4. Also the extreme ends of the splints project downward at the sides of the basket. Now, by pulling these projecting ends downward, the slack in the loops is removed and the inserted pitigua drawn firmly down upon the edge of the woven portion of the basket, thus producing a smooth and even edge or border. Nothing remains, then, to complete the basket except to cut off the loose ends of the warp elements which project from the sides of the basket. The length along which each of these warp elements is returned down through the side of the basket to make this binding varies greatly and may be as great as half the height of the basket, as is the case in the large burden-basket shown in pl. XCII, 7. On the other hand, it is rarely less than equal to the width of eight or ten of the woof elements, thus in any case giving a good firm border.

The only other type of border found in wicker basketry is that shown in pl. XCIV, 8, which was found in only one instance—a very open-meshed basket made of pambile. In this type the projecting warp elements are taken in pairs and each pair is bent inward over a transverse splint placed along the inside, then passed diagonally

downward, then outward to a position in front of the next pair of warp elements, and finally inward and behind the next pair of these elements. Along the outer surface and directly opposite the above-mentioned horizontal splint, another is passed, and these two are secured by two splints passing spirally and in the same direction along the entire border in such manner as to fasten firmly the pairs of turned-down warp elements.

As above mentioned, the wicker technic finds slight use outside of basketry. It is employed in weaving the broad head-bands of the burden-straps which are made of pitigua or of the fibers from the leaf of the palma real, and occasionally in weaving the outer surface of the handle of a fan. In the use first mentioned the elements employed are fairly broad strips of pitigua, as shown in pl. CIII, 1. In the second, the warp elements are made by placing from four to six of the small cylindrical palma-real fibers side by side to form a broad and fairly rigid element. The woof element consists sometimes of but a single palma-real fiber, but usually of two placed side by side as shown in pl. CIII, 3. Occasionally more than two of these fibers are used in such a woof element. The surfaces of fan handles are almost always made, like the blades, in twilled technic, but occasionally one is found which is in wicker, as in the example shown in pl. CIII, 5.

TWILLING

The second technic consisting of two elements is twilling. This is employed in the making of hamper-shape baskets (pl. XCIII, 2, 5, 6, 10, 11); long, tubular

baskets (pl. XCIII, 8), used as receptacles for spindles; mats (pl. CVI, 1, 2); fans (pl. CIV); and rings used as rests for calabashes (fig. 13). In all of these the material used is the bark of the fan-leaf palm, locally called pambil. But one type of basket has been encountered in which this technic is found in combination with another material: this is a square-bottomed, cylindrical basket similar in form to that shown in pl. XCII, 3, and is made of pitigua. A section of the side and border of this basket is shown in pl. XCIV, 6.

The manipulation of the elements in twilling varies considerably in Cayapa basketry. There are three fundamental methods of handling these elements, as follows: (1) A method by which one element passes over two and under two of the elements which run in the opposite direction (pl. XCIV, 3); (2) a method by which it passes in a similar manner over three and under three (pl. XCIII, 6, 10); (3) a method in which an element passes over seven and under one (pl. XCIII, 2, 5, 8, 11; and pl. XCIV, 5). The last form is said to have been introduced among the Cayapa by the Indians of Colombia, and in substantiation of this it may be noted that the few Cholo who now live on the Rio Cayapas use this form of twilling extensively. The two simpler forms of twilling, so far as could be ascertained, have been long in use among the Cayapa.

In case no design is attempted, as in the basket shown in pl. XCIII, 11, or a simple design be desired, as in the baskets shown in the same plate, 6, 10, and pl. XCIV, 2, 3, these fundamental methods of handling the elements are not varied throughout the basket. If, on the other

hand, comparatively intricate patterns are attempted, these methods of handling the elements may vary greatly and appear to be governed solely by the desire of the maker to produce such combinations as will bring to the surface elements of the desired colors in the necessary sequences.

In pl. XCIV, 1, 4, are shown instances of changes of manipulation obviously for decorative purposes. In fig. 4 of this plate the pattern consists of a horizontal row of dots followed by a row of squares joining at opposite corners in such manner as to resemble a section of an old-fashioned lattice; this is followed in turn by another row of dots and another row of squares. This pattern exists in the dark-colored elements as well as in the white ones, and the order of the appearance of a white or a dark element upon the surface is the same for the same direction—that is to say, whether both the elements under consideration run obliquely from right to left or vice versa. The order for those running downward from right to left is thus the direct complement of the order of those running from left to right. In the first case it is over one, under one, over two, under four, once repeated. This cycle completes two rows each of the dots and connected squares, which may be considered a full set of the elements of this pattern. When the elements are taken downward from left to right, the order is: over one, under one, over four, under two.

In the basket shown in pl. XCIV, 1, the manipulation of the elements is even more complex, owing to the fact that the design is much more complicated. In every case the particular pattern employed calls for regular

numerical cycles of its own in the manipulation of the splints. In the design shown in the illustration referred to, the cycles produced by this fairly intricate pattern are exhibited in the accompanying pl. XCVI. In the first of these the cycle is that which results from following the splints downward from right to left, while the second is the result of following them downward from left to right.

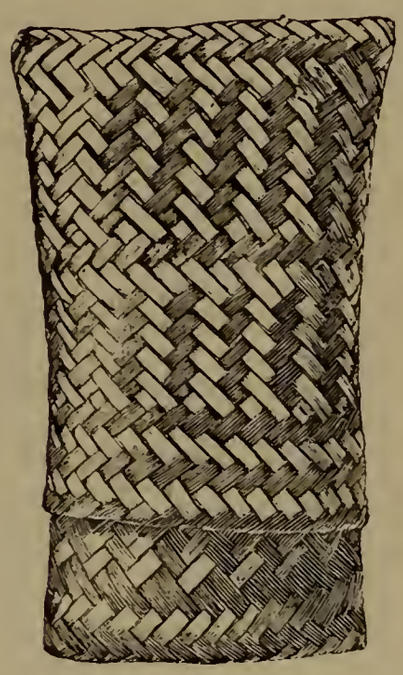


FIG. 15.—Twilled trinket basket

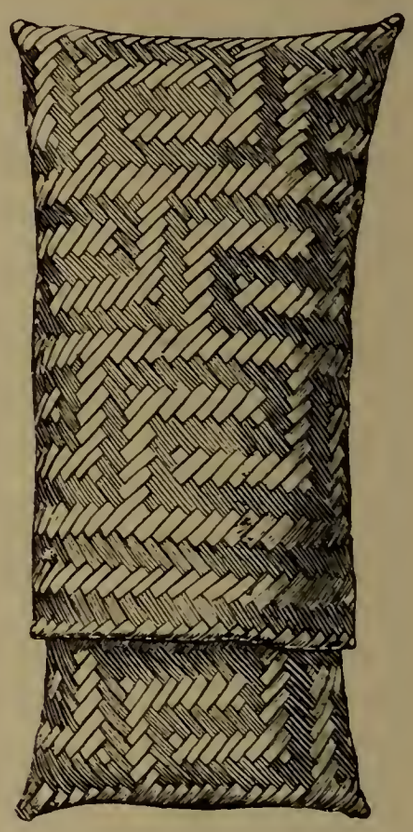


FIG. 16.—Twilled trinket basket

Taken separately, these two show fairly similar and very simple patterns. If, however, they are superposed, the points marked being taken as initial points, the intricate pattern in white shown in pl. XCIV, 1, results. From these cases and others similarly analyzed it is therefore evident that the exact mode of manipulation of the splints in all Cayapa twilling in which any intricate

pattern is attempted is governed entirely by the pattern desired, and that any numerical cycle will be employed which will bring to the surface the elements required to produce the desired pattern.

In connection with the change of sequence of the elements in working out an elaborate design, the technical processes involved in changing the direction of a line in a simple design, such as a zigzag, should also be noted. By the very nature of this technic the angle formed in changing the direction of a line is a right angle, as may be seen in pl. XCIV, 6. The change in direction is accomplished by shifting, after the vertex of the angle is past, the point of emergence of each successive horizontal element one vertical element to the right or to the left as the case may be. In this way each of the horizontal elements continues to pass over the regular number of vertical elements as the outer surface of the basket is viewed. The same is not true of the vertical elements however. Immediately in the angle the vertical elements are so crossed by the horizontal ones that only one width appears in the case of the first element, three in the next, and five in the third, after which the two divergent lines of vertical elements run regularly over three and under three. The procedure in the over-two and under-two twilling is the same except that the odd

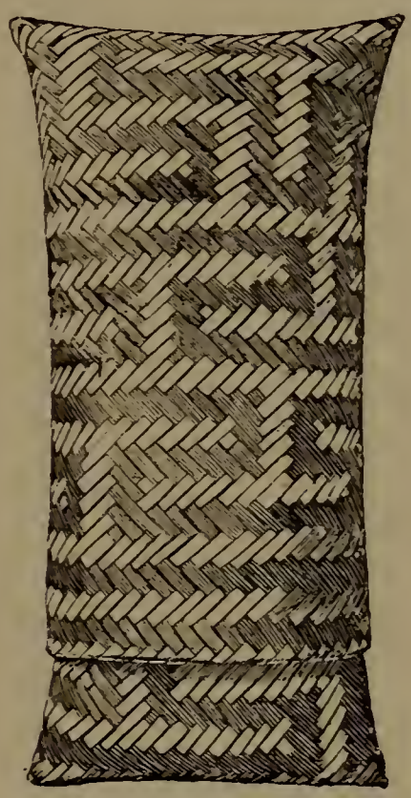


FIG. 17.—Twilled trinket basket

numbers of elements required to change the direction of the line are one and three instead of one, three, and five.

The details of twilled basketry making are well exemplified in the case of the hamper-shape basket which is such a characteristic form among the Cayapa.

In beginning a basket of this hamper form the two sets of elements are laid down at a right angle one to the other upon a level surface, usually a piece of bark cloth spread upon the floor or upon the lap of the weaver. They are first laid with their dark sides uppermost and are crossed in the regular manner as later on in the weaving. Along this initial line the weaver may cause any given element to pass over three of the elements running at right angles to it, and this is frequently done. As frequently, however, such an element passes over one only of the elements that pass in the opposite direction, and the element thus passed over emerges from beneath and in its turn passes over the next element which is laid parallel to the one above mentioned. Thus along the middle line, that is, the starting line, of one of these baskets, there may be a single row in which the elements passing in one direction go over only one of the elements passing in the opposite direction. Beyond this point they pass in the prescribed manner over three and under three, or, in the rare instances in which this is used, over two and under two.

These methods of beginning the base of such a basket are also invariably employed in those baskets in which the sides are made in the more elaborate over-seven and under-one technic above referred to. No instance was observed where this more elaborate technic had been

employed upon the bottom of a basket, not even among the Cholo.

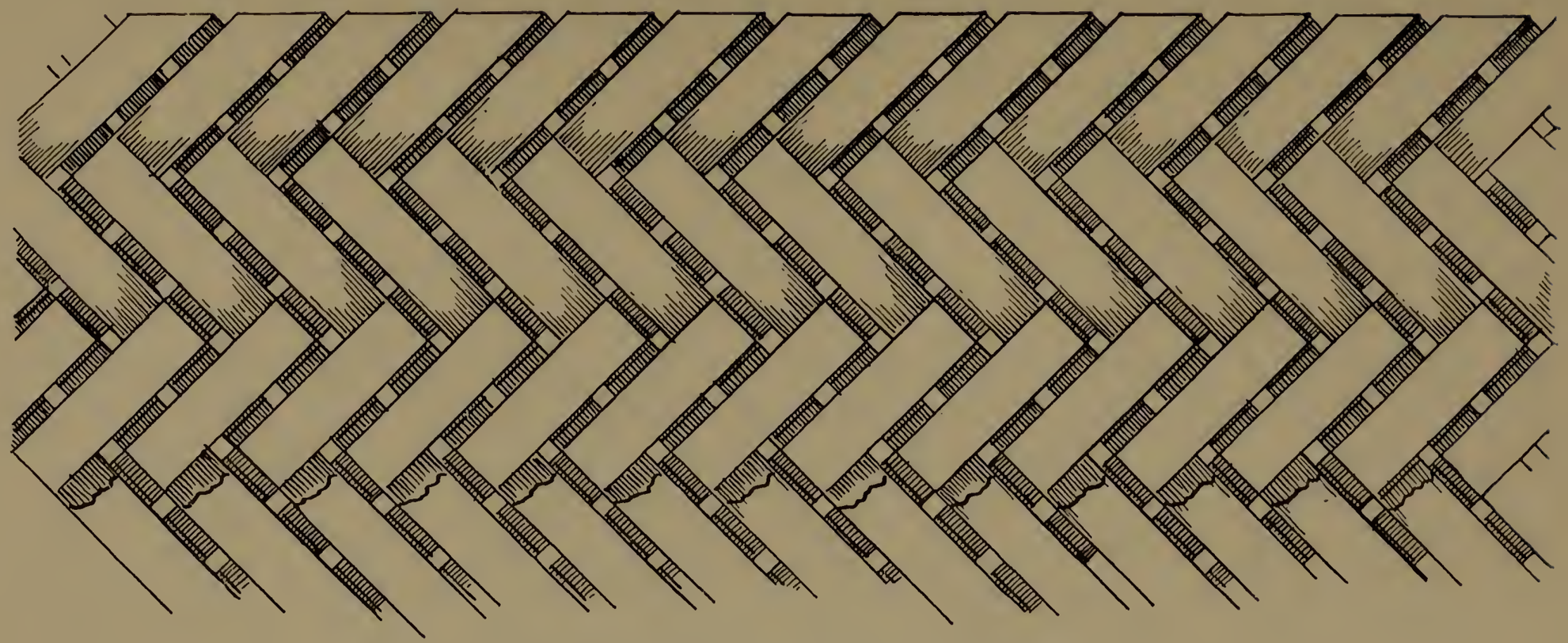
Having first laid down the elements to be used in forming the bottom of this basket, and having manipulated and crossed them properly for perhaps a couple of rows on each side of the middle line, the whole is carefully inspected and the desired design decided on. If it is determined to make a basket in which one set of the elements shall have its dark surface uppermost while the other has its light surface turned up, the elements already laid down are pulled far enough apart to permit the turning over of the one set in order to bring the light surface into view. Frequently baskets are made in which all the elements used have the same surface exposed, for it is feasible to work out a design in case both sets have the same surface uppermost. In such case the design is given purely by the technic itself; and by changing the direction of the twilling, effective results are obtained.

Having, then, determined on the pattern, and the elements having been properly arranged, the twilling proceeds with the adding of more elements as required according as the size of the bottom increases, until the proper dimensions are reached. This results finally in a quadrangular twilled area of the size needed for the bottom or for the top of the hamper, and with a great number of ends of elements, approximately equal in length, projecting from the sides. From this point on no more elements are added, the elements having been properly selected with respect to length, so that these ends are quite sufficient to complete the sides of the basket. Or-

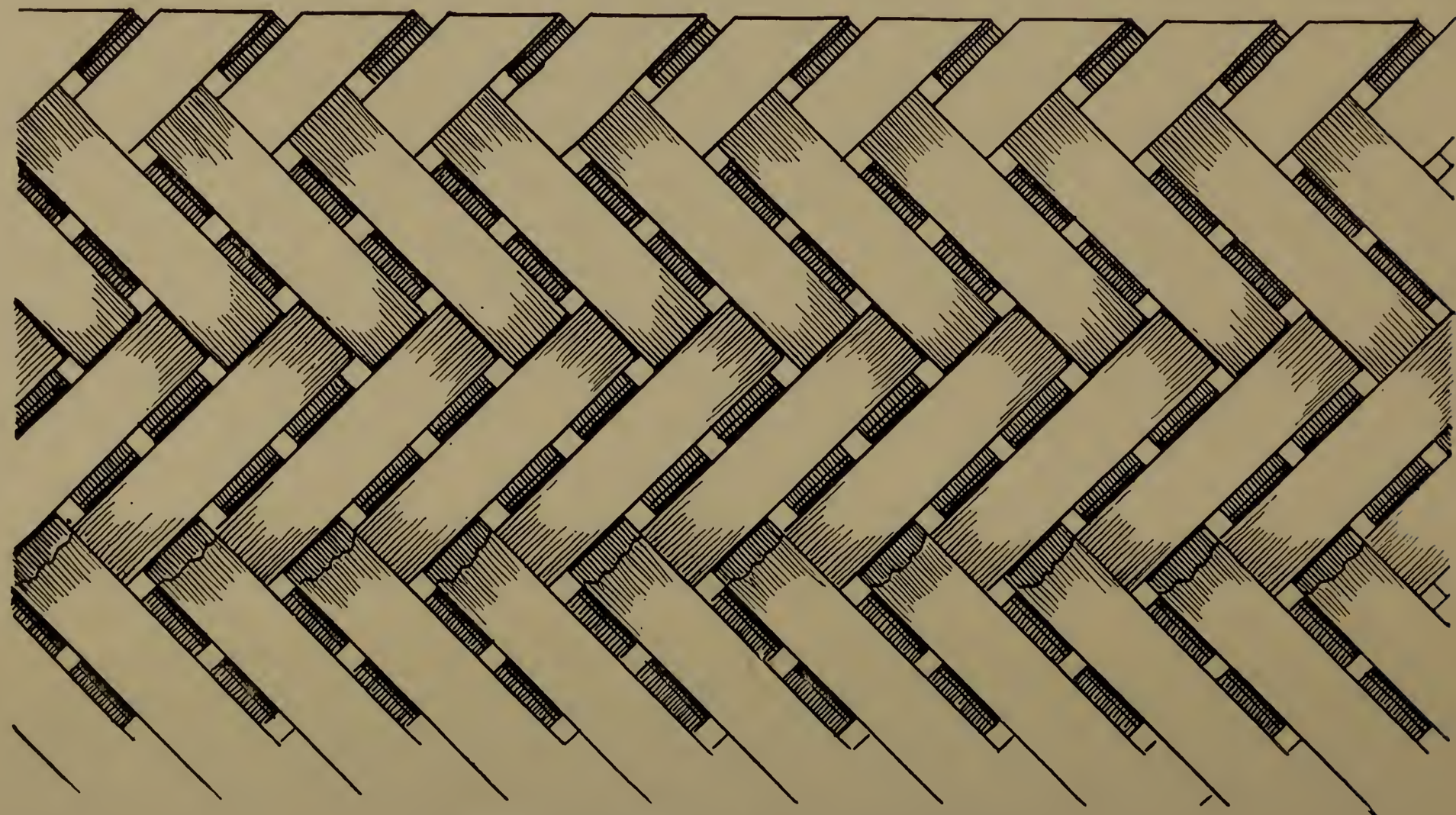
dinarily two of these bases are completed before the sides of either are turned up. They are then carefully measured one to the other, since one must be a trifle larger than the other, as one becomes the upper half or cover of the hamper while the other becomes the lower half or body, and they must fit with fair exactness. At this point a string, a small piece of pitigua, or a small strip of the rampile basket material itself is passed round this quadrangular base and looped under one element at each corner, thus marking exactly the lines along which the sides and ends are to be bent up and especially the points at which the corners are to be made. After gently bending up to a vertical position the untwilled elements along the lines marked out by this string, the twilling then proceeds as in the usual manner and with whatsoever variations of design or technic may be desired until the edge of the basket is reached.

Having arrived at the edge, a piece of pita cord long enough to pass round the basket is placed in along the line upon which the elements are bent over to form the border and serves as a kind of adjustable "draw-string" which may be pulled tight or left loose as necessity demands. Without this, the edge, and later the body of the basket, would gradually work loose and become ragged, but with the draw-string it is not only possible to keep the basket intact, but also to adjust the size of its opening to that of the other half of the hamper.

As is shown in pl. XCIII, 10, 11, on completing the basket to this point there still remain the projecting ends of the two sets of elements, one set outside, the other inside the basket at its edge. These are now employed



BORDER FINISH OF A TWILLED BASKET



BORDER FINISH OF A TWILLED BASKET

in binding the edge of the basket, which is accomplished by either one of two general methods. In the most commonly employed of these the outer set of projecting ends only is used, the inner splints being cut off flush with the inner surface of the basket. In this method of binding there are three variations, as shown in pls. XCVII-XCIX. The essential features of these are the same, and involve first the turning over of each projecting splint at an angle of ninety degrees to its former course, and then passing it back down the outer surface of the basket in such manner as to bind its end securely. The most frequent procedure is to turn such a splint inward and to pass it first behind two, next in front of three, and finally behind three transverse elements on the outer surface of the basket (pl. XCVII). At its emergence at this last point it is cut off evenly with the surface of the basket. In the other two variations of this method, such an element passes behind one, in front of three, and behind three (pl. XCVIII), or behind one, in front of two, and behind two elements (pl. XCIX).

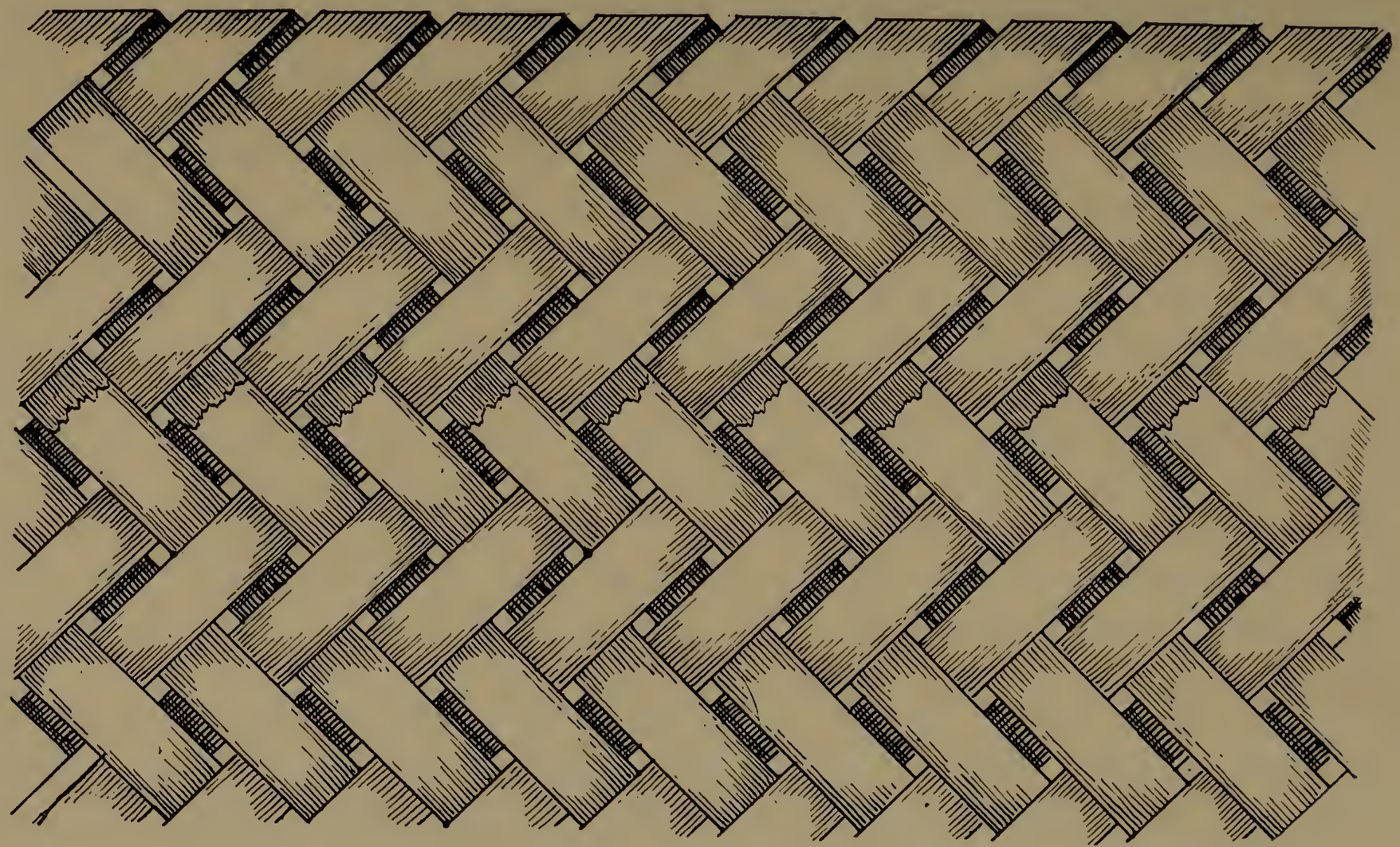
In each of the above instances there still remains upon the inner surface of the basket and projecting from about the border, the other set, or half the total number of elements employed in weaving the basket. These are simply cut off flush with the last transverse elements from under which they emerge, thus leaving this inner surface smooth. There remains then only the adjustment of the size of the opening of this half of the hamper. This is done, as before stated, with the "draw-string," which is then tied securely and holds the opening to its proper size, although it may later require adjustment, as the string stretches and the opening changes.

The second method of finishing the border involves turning both the outer and the inner sets of elements inward and passing them down the inside of the basket instead of turning the outer set only inward and passing its elements down the outer surface as just described. As these elements turn inward and downward, each takes a direction at a right angle to its former course. They are at the same time twilled together for either one or three rows down along the inner surface, thus producing at the edge two thicknesses of twilling. The ends of the inner set of elements are then cut off, while those of the outer set are simply passed down over several (in the cases in hand the number is five, seven, or nine) of the transverse elements of the regular wall of the basket and each is then securely fastened by being passed behind three transverse elements in the wall of the basket itself. On emerging from behind these, such an end is cut off flush with the surface. The inner surface of such a border is shown in pl. c.

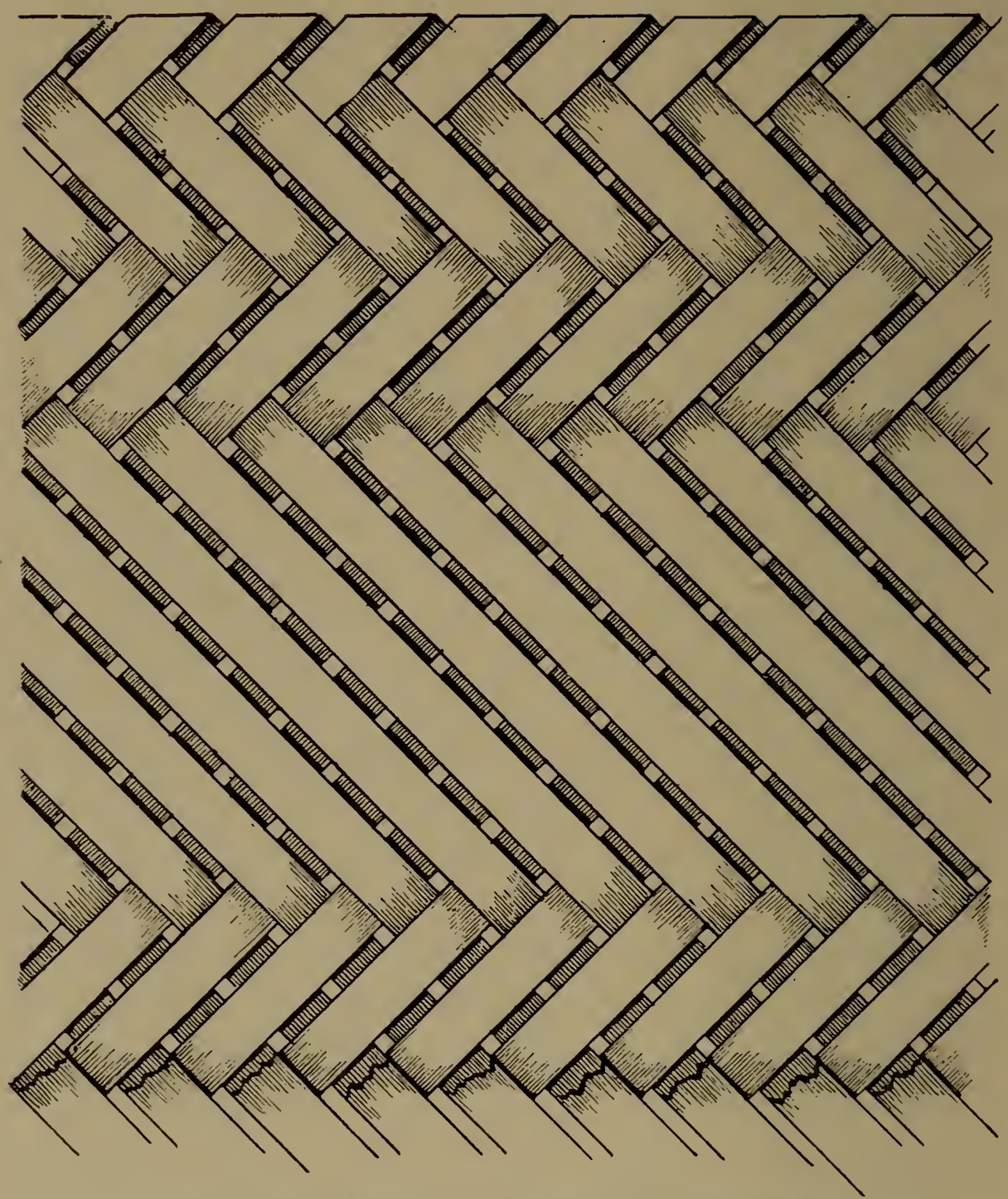
The same "draw-string" as that used in the above-described types of border is required for this one, although this finish produces a much smoother and thicker border than the others, since there is here a double wall of twilling.

The foundations or starting points and borders of twilled baskets of forms other than the hamper are the same in principle as those employed in the hamper-shape baskets, the only variations being those which arise from the form of the basket.

The border shown in pl. xciv, 6, is a notable exception, just as this basket itself is notably different in form and



BORDER FINISH OF A TWILLED BASKET



BORDER FINISH OF A TWILLED BASKET

material, as has been previously pointed out, from those of this technic. The border in this case is essentially the same as that shown in fig. 8 of the same plate, which has been described in detail in speaking of the borders of wicker baskets. It differs only in that the ends of the twilling elements are turned over in groups of three instead of in pairs, in that one horizontal element is run around on the inner instead of the outer surface, and in that the two spiral binding elements pass in opposite directions instead of in the same direction, thus causing them to cross instead of to parallel each other.

KA′PŪ TECHNIC

Of the three technics in which elements passing in three different directions are employed, the simplest is that called by the Cayapa ka′pū, from kapū′ka, signifying eye, this name being derived from the hexagonal opening produced by the technic, which the Indians conceive to resemble an eye. It will perhaps facilitate the description of this technic to letter, in the accompanying illustrations, the elements used therein and the figures and angles which these produce.

Three pairs of elements are required to produce a single unit of this technic, the elements of each pair passing in their particular direction and standing in certain given relations to the remaining elements in the set. Thus, in fig. 18 the two elements A and A′ pass obliquely upward toward the right, and B and B′ pass obliquely upward toward the left, while C and C′ pass horizontally. The exact relation in which any one of these elements stands

to any other element is shown by this figure and need not be described in detail here. It should be noted, however, that it is by means of the third pair of these elements that the other two pairs are bound. If taken alone, any two pairs of these elements are found simply to pass over each other, while the elements of the third pair pass through the angles formed by the intersections of the elements of the other pairs and thus bind the whole figure firmly together. This holds good in every instance, no matter in what order the pairs of elements are considered. The details of this technic are well illustrated in the baskets shown in pl. XCII, 8, and XCIII, 9. An examination of these will show that the above statements concerning the relations of these pairs of elements one to another in a unit figure holds true for the entire basket, and that if one element, A, passing in a given direction stands in a certain definite relation to another element, B, passing in another direction, then all the elements which are parallel to A stand in the same relation to all elements running parallel to B.

The result of the crossing of these six elements is two equilateral triangles, X Y Z and X′ Y′ Z′, superposed in such manner as to produce a six-pointed star as shown in fig. 19. The central opening in this figure is a hexagon, *a b c d e f*, and it is this opening which characterizes the technic and gives the basket the name of ka′pū pickalyi, or eye-basket.

In beginning the manufacture of a basket of this technic no special knot or other device is used. Six elements are so laid on a convenient flat surface as to produce the first or central "eye," which may be con-

sidered as the initial six-sided figure about which the rest of the bottom is constructed. These elements first laid down must stand in the relations one to another that are above described. From this point on, the formation of the bottom of the basket is a simple process, consisting of adding the necessary elements in the proper order and along lines parallel to those of the original six elements above mentioned. This process of adding on all six sides of the original opening continues until a hexagonal bottom of the desired dimensions and proportions is produced. The size of such a bottom is obviously governed by the size of the basket desired. In form these bottoms are usually equilateral except in the case of the particular type of burden-basket shown in pl. XCII, 6, in which the bottom is about twice as long as it is wide.

From this woven bottom a large number of radial elements extend out on its six sides in as many groups, each group composed of parallel elements. Obviously the angle between any two of these groups occurs at one of the corners of the hexagonal woven area and is an angle of approximately one hundred and twenty degrees.

At this point in the process of weaving these radial elements are turned abruptly up to form the vertical sides of the basket. Theoretically the individual elements themselves might be brought up in a perpendicular position, or at almost any desired angle to the perpendicular, so long as the result as a whole is a vertical wall, but in practice the same technic is maintained in these sides as is used in the bottom. In order to produce this, each element is turned up in such manner that it slants along this wall of the basket at an angle of about thirty

degrees to the perpendicular, one set of elements slanting toward the right while the adjacent set slants toward the left, the inner angle formed by any intersection being therefore one of sixty degrees. As a matter of fact the exact slant of these elements varies considerably, and

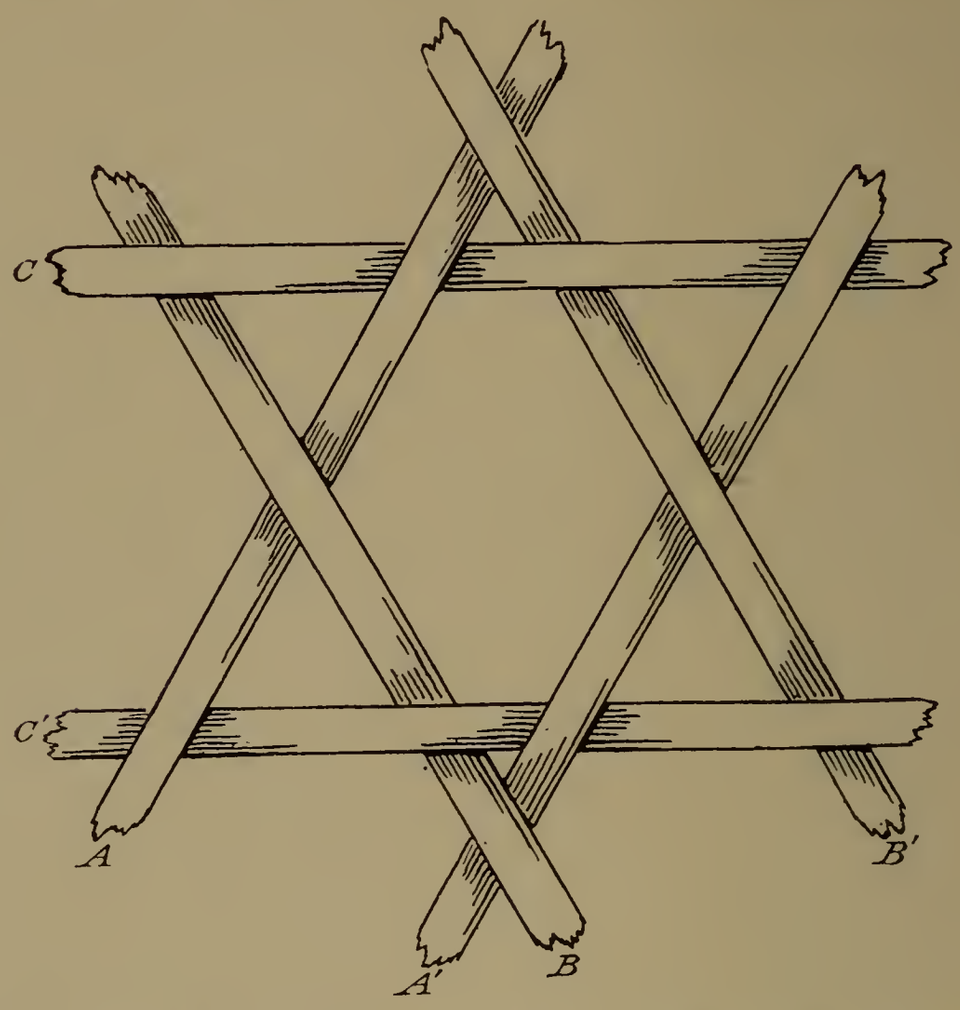


FIG. 18.—A unit of ka'pū technic showing relations of the three pairs of parallel elements

the angles made by their intersections vary accordingly, so that the resultant figures have a variety of shapes, although all approach more or less the true hexagon as shown in the schematic figs. 18 and 19.

However, if only the elements used to form the bottom were employed in making these sides, there would be but

the two sets of elements crossing obliquely and a four-sided opening or mesh would result. As has been shown, however, in this technic elements passing in a third direction are required, and it is therefore necessary to bring two new horizontal elements into combination with each set of two pairs of the diagonal elements above mentioned which go to produce the four slanting sides of the hexa-

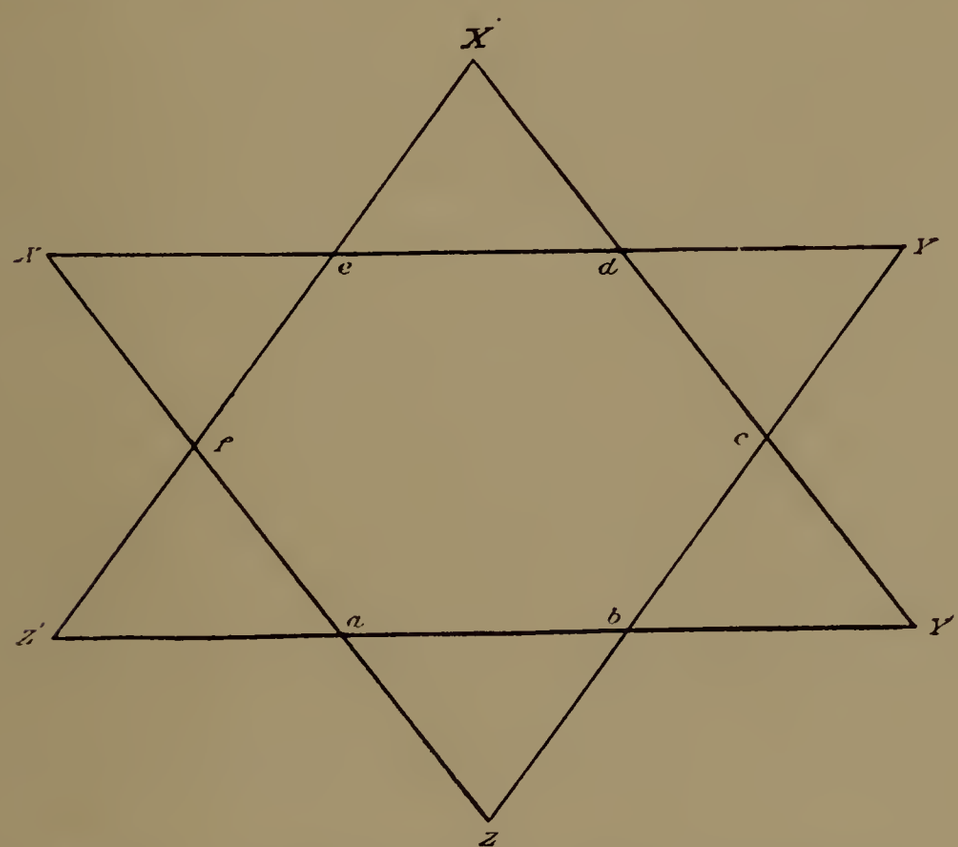


Fig. 19.—Component parts of a unit of ka'pū technic

gon, as shown in fig. 18. These two horizontal elements cut off the top and bottom of the quadrilateral opening which would be produced by the simple crossing of the elements brought up from the bottom of the basket alone. They are produced by inserting another splint in such manner that it passes horizontally in a clockwise direction and forms a continuous spiral, passing up the

side of the basket and cutting through the lowest and the uppermost angles respectively of the quadrilateral figures formed by the intersection of the four diagonal elements which came from the bottom of the basket. This produces two more sides and two more angles, and the result is that all the openings in the sides as well as on the bottom of the basket are hexagonal in form. As a rule a very long piece of material is used as this horizontal splint, but whether long or short it may be made a continuous spiral throughout the whole side of the basket by inserting a new splint when the end of the one in use is reached. This is done by overlapping the two splints for an inch or two and in this way giving the effect of continuity. Thus the sides and the bottom of such a basket are built up in exactly the same manner, except that, owing to the ever-increasing diameter of the bottom, it is necessary to add a new splint each time another horizontal element is required, instead of using a continuous splint which passes spirally about the basket as is done in the above-described method of treatment of the side.

In the closely allied technic called tcī′nde the prevalent method of inserting these horizontal elements is by putting in a separate splint for each horizontal element in the basket. In this case each splint makes simply one complete circle about the basket and has no connection whatever with any of the other horizontal elements. So far no instance of this treatment of these horizontal elements in the ka′pū technic has been encountered. It is quite possible, however, that a larger series of these baskets might show some cases of this,

just as one exception to the usual clockwise direction of the long continuous spiral element has been encountered.

There is one notable exception to this shape of opening or mesh. At the six corners of the bottom of the basket the openings are pentagonal instead of hexagonal. This is due to the fact that no horizontal element passes through the opening at its lowest inner angel (angle

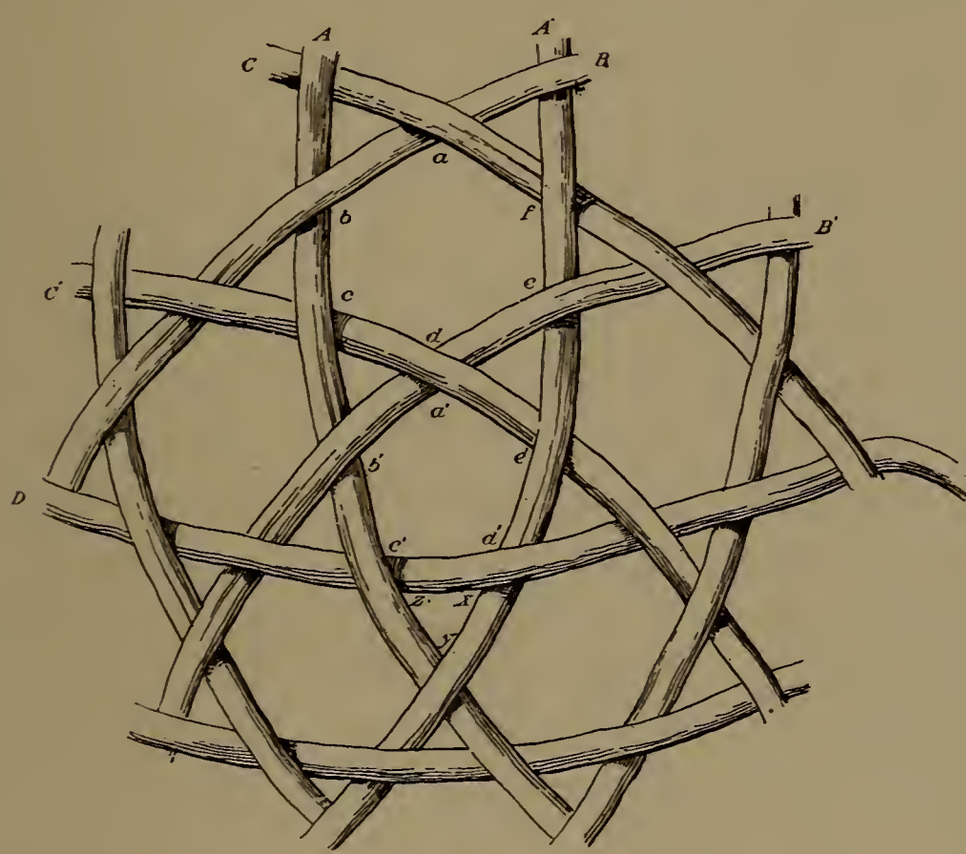


Fig. 20.—Pentagonal opening at one corner of the bottom of a basket of ka'pū technic

e' a' b', fig. 20). A horizontal element, D, cuts across the opening at its topmost angle (angle *x y z*) and thus adds to the figure formed by the regular oblique elements, A, A', B' and C', only one more side instead of adding two sides as is done when two horizontal elements are used in the regular way.

The reason for the absence of this second horizontal

element in this opening is that the element C′, which was the upper horizontal element used in the preceding mesh, *a b c d e f*, now changes its course as it turns upward to enter the side of the basket and becomes one of the diagonal elements. At this transition point between the bottom and the side this element C′ really occupies the same position and stands in the same relation to the remaining elements at this point as does the regular lower horizontal element in any other mesh. If a lower horizontal element were really to be inserted at this point, it would necessarily cut across the present angle *e′ a′ b′* and would stand in the same relation to the other elements it would cross that the element C now occupies in crossing A′ and B to form the two angles *f a b* and *e f a*. As a matter of fact, however, C′ now occupies exactly this position, so that no extra element could be inserted at this point.

It is an interesting fact that, when the horizontal element which runs as a spiral about the basket is added, it is not simply inserted at the point where it becomes active as a horizontal element, which is always at one of the points of the hexagon which constitutes the bottom of the basket, but the initial end of the element passes back diagonally up the side and serves as a diagonal element the same as if it were one of those originally used as part of the bottom.

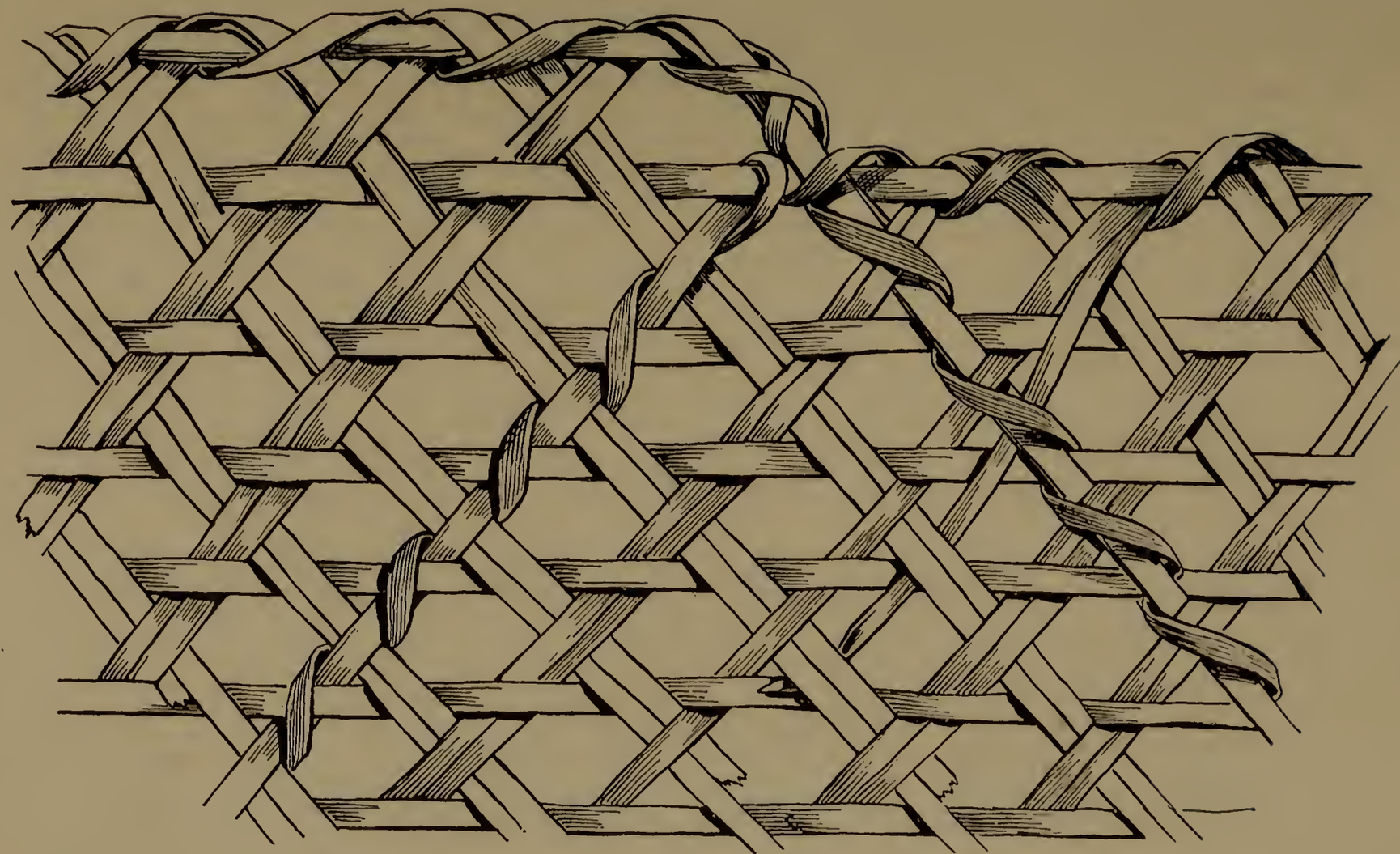
Furthermore, it should be noted that in all the cases at hand, except one, the spiral so produced progresses in a clockwise direction as the exterior surface of the basket is viewed. This is in accord with the observed tendency of Cayapa weavers in general to proceed in

their work toward the right, so that the isolated instance in which the spiral progresses in a contra-clockwise direction is quite striking.

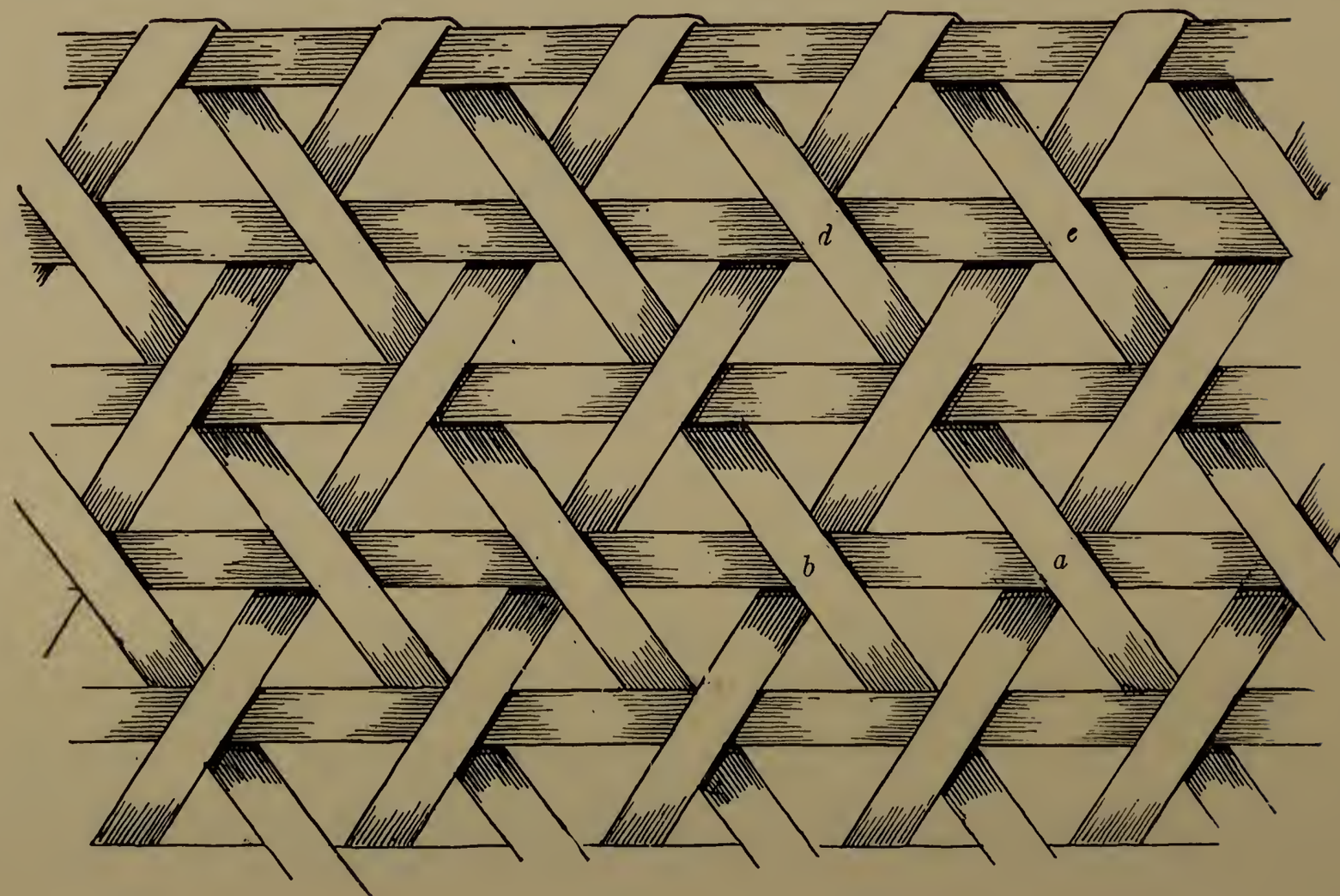
The regular process of weaving, as above described, continues until the border of the basket is reached, where any one of several methods may be brought into play in finishing the border. The one most usually employed is that of bending toward the right, at the border, each pair of diagonal elements at their last point of intersection at the very edge of the opening, passing these inward and downward behind a single strip of pitigua, and then out upon the outer surface of the basket. They then pass more or less obliquely across the adjacent pair of intersecting splints, and finally back onto the inner surface of the basket, and either simply behind the next pair of intersecting splints or behind these and then outward through the mesh next below. There is almost invariably employed a spiral wrapping about this border, sometimes in one direction, sometimes in both, which latter method makes two crossing spirals. As this wrapping of the edge is done, there is ordinarily placed along the outside of the basket, at its edge, an extra splint which is included in the wrapping, thus giving greater strength and greater rigidity to the basket. Now and then one of these extra splints is added on the inside as well. Furthermore, occasionally a basket is found in which the loose ends of the diagonal elements are simply bent over and laid horizontally along the edge and are included within the spiral wrapping.

In burden-baskets of the type shown in pl. XCII, 8, and occasionally in other forms also, there occurs a very simple type of border finish, in which the ends of the diagonal elements are merely turned downward over the last horizontal element and made to pass along parallel to one of the regular diagonal elements forming the side. Such a border is shown in pl. XCIV, 12. In this particular case these returning diagonal elements pass upon the side of the horizontal elements opposite from those occupied by the corresponding original diagonal elements. Also they pass through the wall of the basket out in the hexagonal opening at any given point. As shown in pl. CI, such a returning element often takes exactly the same course as that of the corresponding original diagonal element, and it frequently passes through one of the very small triangles formed by the technic instead of through the hexagon. In fact it is sometimes superposed upon this original diagonal element to a certain extent. Further, this figure shows an interesting feature in that the wrapping of the border is continued down into the side along one diagonal line, while one of the ends of an original diagonal element is bent back on itself and passed back down into the side of the basket as a similar wrapping.

This ka′pū technic is perhaps more frequently applied than any of the others employed by the Cayapa in basketry. It is, however, confined entirely to basketry, and for this reason should be considered as ranking next to twilling, which is used in making mats and fans as well as basketry.



BORDER FINISH SHOWING RETURN OF DIAGONAL ELEMENTS AND WRAPPING



TCĪ'NDE BORDER WITH ELEMENTS RETURNED BELOW

TCĪ′NDE TECHNIC

The second of the technics in which elements passing in three directions are used is that called by the Cayapa tcī′nde, a name for which no translation could be obtained. The details of this technic are shown in pl. XCIV, 11, and pl. XCV, 4, 8, 10, 13. In pl. XCII, 1, is shown a typical basket of this technic. This, however, is one in which the diagonal elements of the sides are returned downward and produce a complicated form of the technic.

In detail the tcī′nde technic is identical with the ka′pū technic, except that there is added another horizontal element which bisects the hexagonal opening of the ka′pū and gives two trapezoidal openings (fig. 21). This is done by passing a splint horizontally through the angles at *c* and *f* (fig. 19) in such manner that it passes between the two diagonal elements which cross each other to form the angle of the hexagon at each of these points. The new horizontal element passes, therefore, under B and B′ and over A and A′ (fig. 18). This is the simple course of such a third horizontal element in its relation to a single one of the hexagonal openings of the ka′pū technic. Its course throughout a series of these openings on the side of the basket is the same as that outlined for a single opening, so that this third horizontal element passes continuously in this manner from one opening to the next throughout the whole series in the sides of a basket.

Such is not the case, however, on the bottom of the basket, where a special manipulation is employed, as is

shown in pl. XCV, 4. Beginning with the hexagonal opening which forms the center of the bottom of the basket, the end of this third horizontal element is passed through the opposite angles at *c* and *f* of the hexagon (fig. 19), thus cutting this initial hexagon into two fairly exact trapezoids. In the instance shown in pl. XCV,

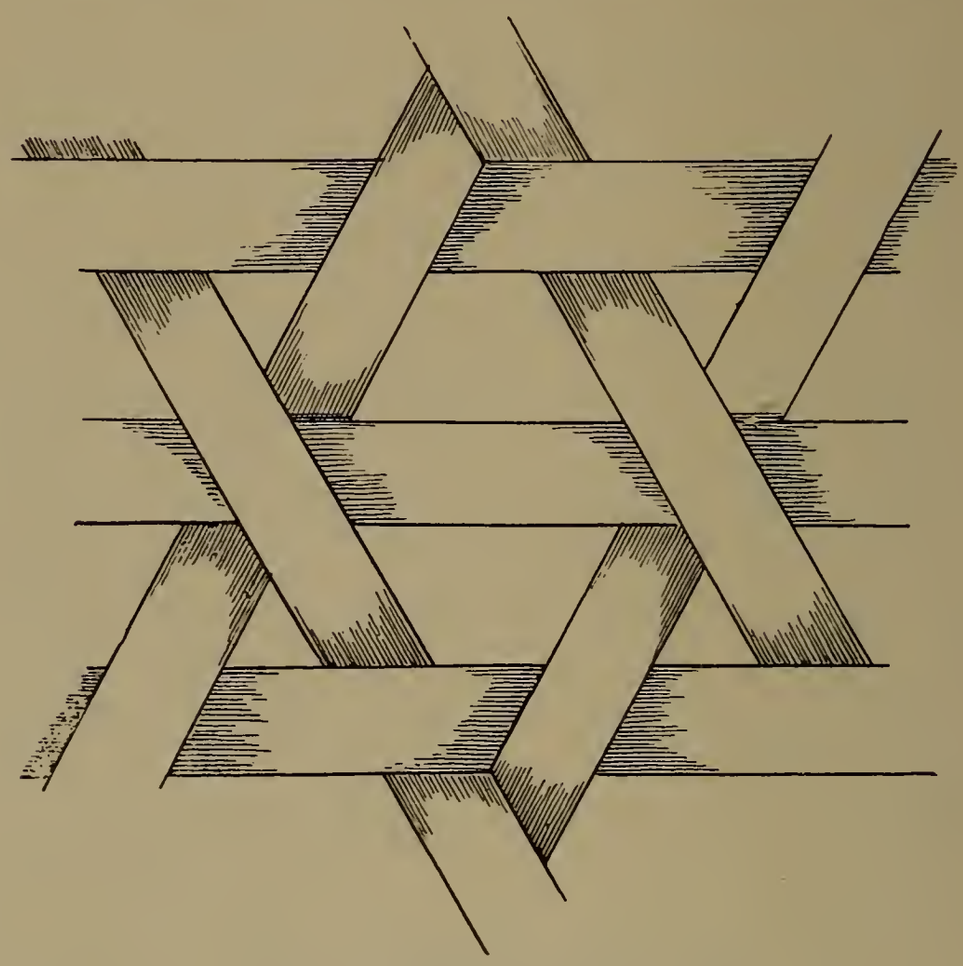


FIG. 21.—Detail of tcī'nde technic

4, this initial insertion is so made that the horizontal element does not pass directly across the hexagon, thus forming two exact trapezoids, but in the majority of instances these figures are of fairly exact form. This element, after passing between the two diagonal elements which cross at *f*, extends on into the next hexagonal opening toward the left as the bottom of the basket is

viewed. At this point the fundamental difference between the treatment of this third horizontal element on the bottom of the basket and that which it receives on the sides, begins to manifest itself. If this element on the bottom followed exactly the course which it does on the side of the basket, it would obviously go directly out in a straight radial line from the center of the bottom. Instead it folds under in such manner as to change its direction sufficiently to enable it to take a course toward the second intersection of elements forming the hexagon from that through which it has just passed. This brings it to one of the angles (angle *f o b*) formed by the crossing of the lower one of the horizontal elements forming this hexagon and one of the diagonal elements. It does not pass between these two elements, but entirely around them at their intersection. It then passes across the opening to the diametrically opposite angle of the hexagon. Here it passes between the two crossing elements, after which it again changes its course and passes directly to the next angle on the left. At this point it takes another turn around the intersection of the two elements which cross here and again goes to the diametrically opposite angle where it passes between the two elements that cross at this point. Thus, by a repetition of this process, this third horizontal element is made to move in a clockwise direction, as the bottom of the basket is viewed, and is caused to take a spiral course which makes it cross successively each of the hexagonal openings of the entire bottom of the basket. In every case except the first the change of direction is given by a move from the angle at which

this element enters a given hexagonal opening to the angle next adjacent in a clockwise direction. In the first case this move is one of two angles in a clockwise direction instead of one. This variation produces an interesting sequence in the number of openings passed over by this element in a given complete circle. The first four changes of direction after the element leaves the hexagon in which it commenced cause it to pass over one opening only in each case. It then passes over two openings, this time running parallel to the initial direction it had at the outset. It next crosses one opening only, after which it crosses successively two openings each time for the next four changes of direction. On again reaching a point where its direction is parallel to that which it had initially, it crosses three openings, after which it drops to two, which in turn is followed by four sets of three openings. Thus by a series of these concentric hexagons in which the numbers of openings all follow the sequence above outlined, but with numbers which increase one each at each new revolution in the spiral, the entire bottom is built up until this special treatment of this third horizontal element finally gives place to its regular manipulation when the side of the basket is reached. The cycle may be reduced to a kind of formula in which x equals the fundamental number of openings passed over in any given complete circle of the horizontal element. The formula would then be $x + x + x + x + (x + 1) + x$.

It should be observed that in making this bottom the third horizontal element always stands in the same relation to any certain element in any given turn of its

spiral course that it does in any other turn. An inspection of fig. 4 of pl. XCV will show this to be the case, and that where this third element passes round any certain element in one turn of the spiral it always passes round the same element in every other turn of the spiral.

On finally reaching the edge of the bottom, the looping of this horizontal element ceases, since this course is necessary only in order to increase the diameter of the bottom, just as the other horizontal elements are constantly added for the same purpose. The manipulation of this third horizontal element then changes, and it runs, as above described, either as a continuous spiral or, as is much more frequently the case, as a series of single detached bands, each passing completely around the basket.

In the cases in which the spiral treatment of this third horizontal element is employed, the horizontal elements which form the top and bottom of the hexagon are furnished by another spiral running parallel to this third element which cuts the hexagon into its two trapezoidal figures. Like the spiral element on the side of a basket of the ka′pū technic, the initial end of this one commences at the edge of the basket and runs down as a regular diagonal element to one corner of the bottom, where it changes its course to the horizontal spiral above mentioned.

In one instance in which the bottom of a basket is made in the ka′pū technic while the sides are in the tcī′nde technic, the two long spiral elements required to produce the latter pass down the side of the basket

immediately adjacent to and parallel to each other, and enter it at the same corner of the bottom.

Any one of several border finishes may be used at the edge of a basket of this technic, but there is one border which is the result of a variant of this technic and which is similar to one of the border finishes used in connection with the ka′pū technic.

In this variant the two sets of diagonal elements, one of which reaches the rim of the basket on its outer surface while the other reaches it on the inner surface, are turned directly downward over the last horizontal element at the edge of the basket and each element is passed back down into the body. This is so done that each returning element of one set takes the direction of the opposite set, and so that each element passes in and out of the openings in the regular tcī′nde technic in such manner as to include between each pair of crossing diagonal elements one of the horizontal elements. Thus one of these diagonal elements passes over the two original elements which crossed at *d* (pl. CII) under the central horizontal element at its middle point, and over the two elements which intersect at *a*. The returning element passing in the other diagonal direction passes below at *e*, above and across the central horizontal element at its middle point and again below the two elements which intersect at *b*. An example of this technic is shown in pl. XCV, 10, and CII. In this manner each horizontal element in each unit of the technic is included between two of the diagonal elements.

This method of employing the returning diagonal elements produces a very tightly woven basket and may

be used on the sides only or it may be made to cover also the bottom. As a rule both these forms of this technic are used chiefly in the making of cylindrical storage baskets of various sizes.

DŌ TECHNIC

The third of the technics in which the elements pass in three directions is that known to the Cayapa by the name dō. This technic in basic principles is similar to that called ka′pū, and differs only in that in any single unit of the technic there are three additional splints each of which passes through opposite angles of the hexagon, as is shown in the accompanying figs. 22 and 23. This divides each of these hexagonal openings into six small equilateral triangles and forms a relatively tightly-woven basket, when compared with the ka′pū and the tcī′nde technics.

In each unit in both the ka′pū and the tcī′nde technics there are, in addition to and surrounding the principal openings (which in the one case is a single large hexagon, and, in the other, two trapezoids), six very small equilateral triangles, formed by the superposition of the two large equilateral triangles that make up the geometric basis of the technic unit. In the case of this dō technic, however, there are twelve of these openings, all equilateral triangles and all of about the same size.

Perhaps the most striking feature of a basket made in this technic is the presence of three pairs of heavy splints running radially in its bottom, as is shown in fig. 23 and in pl. XCV, 6. Each of these pairs is used

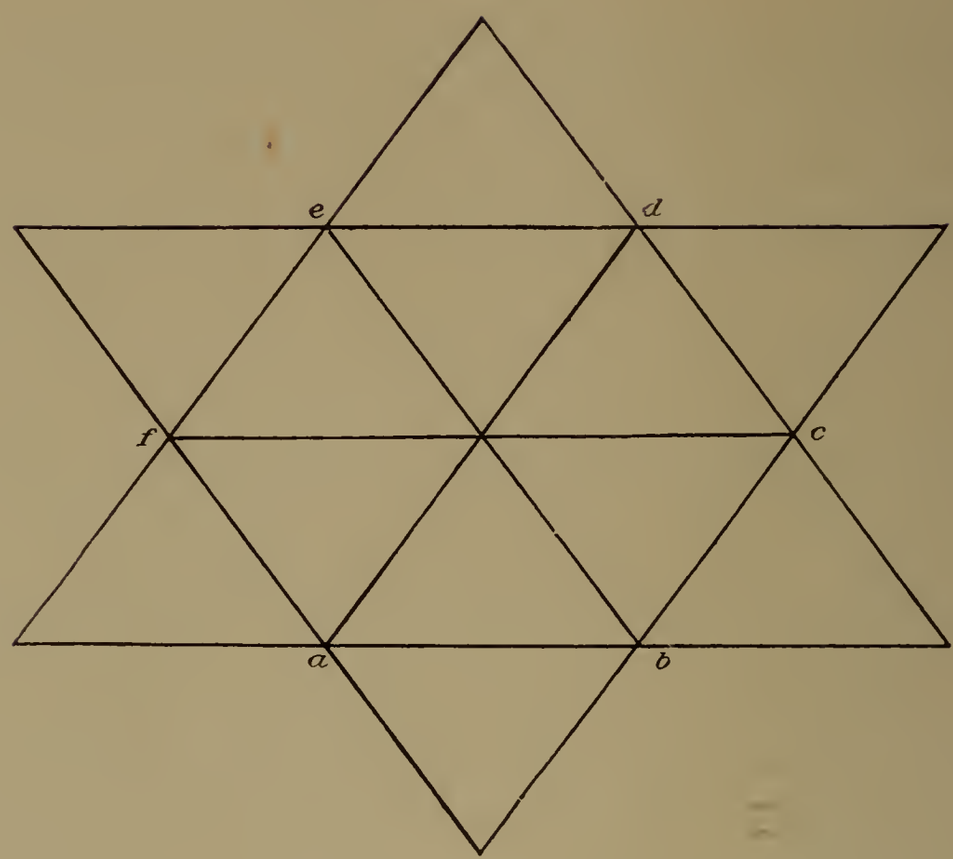


FIG. 22.—Component parts of dō technic

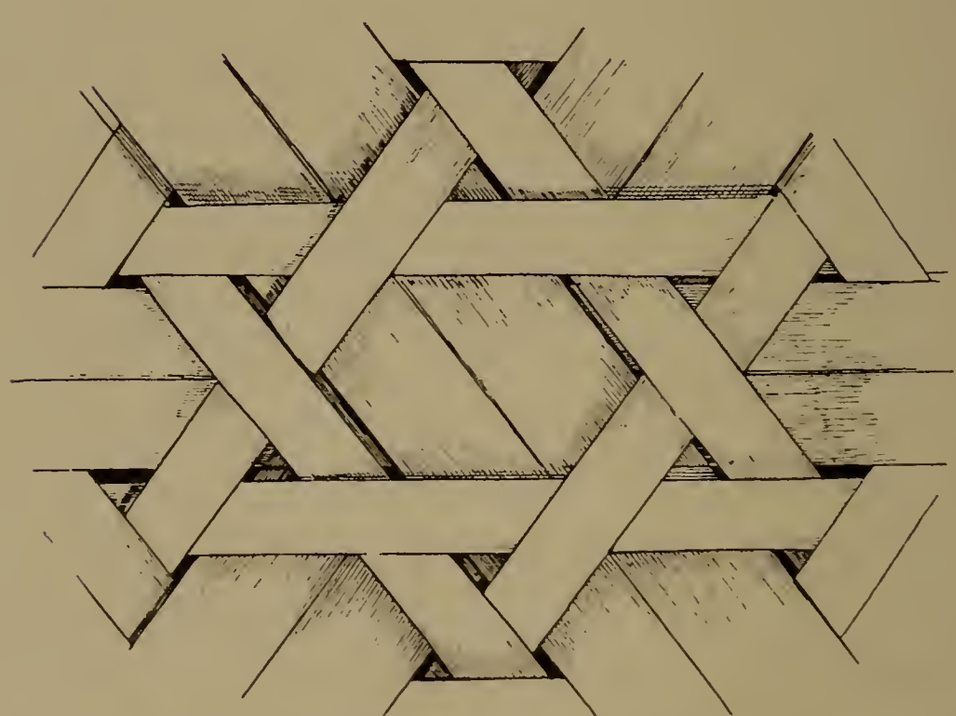


FIG. 23.—Initial unit at the bottom of a basket of dō technic

in the bottom itself in exactly the same manner as a single splint would be, and each passes through two opposite corners of the hexagonal bottom. Thus these three pairs of splints pass out of the bottom at its six corners. On entering the sides, however, each of these pairs is divided and each element of a pair takes an independent diagonal course up the side of the basket, thus producing in its sides twelve elements independent from the three which cross the bottom. In most cases when one of these pairs divides, its units diverge and form angles of approximately sixty degrees one with the other, but in other instances they pass as independent parallel elements diagonally up the side of the basket. Sometimes both these methods of treatment are found in a single basket. As above stated, in the majority of instances these divergent elements take a diagonal course up the side of the basket, but now and then a basket is found in which one of them runs vertically while the other takes the usual diagonal course, as is shown in pl. XCV, 15, and frequently instances are found in which one or the other of such a pair of elements takes a course more or less approximating the vertical, as shown in pl. XCIV, 9.

In a cylindrical basket the straightness of the walls produces hexagons which are approximately equilateral, but in the rare type which has flaring walls the diagonal elements in the sides gradually diverge toward the opening of the basket in such manner that these hexagons are much elongated laterally. In no case, however, are extra diagonal elements inserted on account of this enlargement of the circumference of the basket toward its rim.

The horizontal elements in the sides of such a basket are produced, as in the case of both the ka′pū and the tcī′nde technics, in one of two ways. They may be, and usually are, the result of a single spiral splint which first passes diagonally down the wall of the basket and enters the side at one of its six corners where the bottom and the sides join; from this corner onward it proceeds as a spiral until the border is reached. The second and a very rare method of securing these horizontal elements is by inserting a new complete band for each element. The ends of such a band are made secure by overlapping, the point at which any particular band overlaps being some distance around to one side or the other from the overlapping of the elements next above and below, thus giving added strength to the technic.

As in the other two technics of this group, the diagonal splints in the sides of a basket of this dō technic are all employed in the construction of the bottom of the basket, and in no instance are any more diagonal elements added in weaving the sides.

The nature of the dō technic is such that there is no possibility of returning the ends of the diagonal elements downward even from the edge of the basket, as is sometimes done in the ka′pū and the tcī′nde technics, where this treatment of these elements forms one type of border finish. The triangular openings are so small, and the basket therefore so closely woven, that the returning of these elements down the side of the basket would be highly infeasible if not entirely impossible.

A notable fact connected with the manipulation of these elements is that in this particular technic the

diagonal element which passes upward toward the left is almost always the one which passes between a horizontal element and the other diagonal element which passes up toward the right at the points where the three cross one another. This condition is quite different from that in the tcī′nde technic, for here what has been called the third horizontal element passes between the two diagonal ones. No comparison can be made with the ka′pū technic, since there is no point in this where three elements are crossed.

In finishing the borders of baskets of this technic the pairs of diagonal elements are usually bent inward and toward the right over a rod of pitigua, the ends of each pair being made to pass out in front of the pair next adjacent and toward the right, and finally down behind the second pair toward the right. To this simple binding, which in principle is the same as that most commonly used in baskets of the ka′pū and the tcī′nde technics, there is frequently added a wrapping of pitigua such as is shown in pl. XCIV, 9. Even more elaborate bindings, such as that exhibited in pl. XCV, 15, are sometimes used by the Cayapa, while among the Cholo a very elaborate one, shown in fig. 16 of the same plate, was found. In its essentials the first is the same as that above described, and it differs only in the number of elements (from three to five) bent over in each group, in having an extra horizontal splint bound along the outside, and in having three courses of wicker run into the relatively large openings just below the bound rim.

The second mentioned binding is essentially the same as that just described except that the ends of the pairs

of elements when they reappear upon the inner surface of the basket are made to pass down under the similar pair next to the right, as is shown in pl. xcv, 16, which exhibits an inside view of this border. Thus there is produced a technic somewhat resembling what is commonly called herring-bone. The extreme edge appears to be very elaborately wrapped; this, however, is due to the manner in which two broad, flat wrapping elements are brought around it. So far as observed, this particular type of border finish does not occur among the Cayapa, although it is frequently employed by their Cholo neighbors, with whom this particular technic itself is more commonly used. In fact it is rather rarely used by the Cayapa.

BANDILAS TECHNIC

The technic called ba'ndilas by the Cayapa is the only one of the six technics employed by these Indians which has elements passing in four different directions. A horizontal, a vertical, and two opposite diagonal elements are required in this technic. Unlike the several above described, no special method is required in commencing a basket of this technic, its bottom being woven in exactly the same manner as are its sides. The horizontal elements on the bottom turn up, as do the diagonal and vertical ones, to form the elements of the sides. Obviously these elements, which are horizontal upon the bottom of the basket, become vertical when turned up to form the sides, and there is then the necessity of introducing other horizontal elements. This is ac-

complished by introducing complete bands which pass round the basket and whose ends overlap. The spiral horizontal element is never used in this technic as it is in some of those above described. The bottoms of these baskets are almost always rectangular, but not square, and the basket as a whole appears somewhat more angular than do the baskets of other technics except the hamper-shape twilled baskets, in which angularity is especially sought. A basket of this technic is shown in pl. XCII, 3.

The border of such a basket is finished in a manner similar to that employed in finishing the borders of baskets of the ka′pū and tcī′nde technics above described. The vertical and diagonal elements project above the border and at their points of last crossing form sets of three elements, one vertical and two diagonal crossing at the same point. These three are as a unit turned inward and downward, passing diagonally out and in front of the next set toward the right and finally inward and behind the next set. As these sets turn downward they pass over a horizontal splint, which is thereby included in the fold of each set of three elements. There is usually placed also a similar horizontal splint on the outside of the basket and one on the inside, the whole edge being bound by one or two spiral elements. One or the other of these outer horizontal elements may be omitted, but ordinarily both are present. In pl. XCIV, 10, and pl. XCV, 9, are shown two examples of borders in which are present two spiral elements running in opposite directions. In both these also the inner and outer horizontal elements are present. In the example shown

in pl. XCV, 11, on the other hand, the outer horizontal element is absent and there is but one spiral element. In this instance, however, there are two horizontal elements running like wicker through the openings immediately below the border and serving to give additional strength to it.

Baskets of this technic are among those more rarely made by the Cayapa. They have no special use, but serve any of the many ordinary household purposes to which Cayapa basketry is put, such as the storage of small articles and various foods.

In addition to the six technics above described, here termed the regular basketry technics, there are the two employed to a very limited extent in making the palm-leaf burden-baskets, which are used temporarily and only in emergencies for carrying burdens, or are now and then employed ceremonially by some shaman in his medicine practices. Two of these baskets are shown in pl. XCII, 2, 5.

In the first the technic resembles checkerwork to a certain extent. Such a conical basket is made from a single large pinnate leaf of the palm called by the Spanish chapil and by the Cayapa kūla′pō-tcī. Such a leaf is often as much as ten feet long. Perhaps eight feet of this is serviceable for basket-making, the two feet near the tip of the leaf being rather weak and provided with short leaflets. Having broken off the unserviceable section at its tip, such a leaf is bent at its middle point and its leaflets are interwoven after the fashion of checkerwork, thus producing a loosely woven basket with large meshes. The remaining ends of the

leaflets are at last wrapped about the edge and bound loosely to secure them and produce the border of the basket.

The second type of palm-leaf basket is square in cross-section and has vertical walls. In this, two leaves which are made to cross each other at the bottom are used. The bottom of such a basket is usually about a foot square and the walls are two and a half or three feet high. The midribs of the leaves pass up the middle of the sides, and the leaflets, entirely unwoven, form the sides themselves. Extending up the four corners are heavy rolls formed by these leaflets, and it is in these that the particular technic employed only in this type of basket is found. When the two midribs are crossed at their middle points, they are securely bound together to keep them in position during the manipulation of the leaflets in making the corners of the basket. At a point five or six inches from this center, each of the midribs is then bent upward. As the leaves are thus placed in position, the leaflets extending out from the right-hand side of one midrib cross those extending from the left of the adjacent midrib. Beginning at the bottom, one of these leaflets is passed round a corresponding leaflet of the opposite set, its end joining that of the leaflet it has just gone round in passing upward to help form a core about which the other leaflets are in turn passed. In passing about this core each leaflet goes completely round it, coming back to the front below itself and then folding abruptly upward over itself to enter the core. This produces the technic which in the preceding pages was likened to the "half-hitch" in

cordage. By this process of passing these leaflets from first one side and then the other round this core of leaf-ends, a corner of the basket is built up to its topmost point, where the ends of the last two or three leaflets are tied in such manner as to prevent the corner from loosening. In the same manner all four corners are built up and the basket is then complete.

Forms and Uses

According to form and use, Cayapa basketry may be classed as follows:

Burden-basket, flaring,	kū'bī (pl. XCII, 4, 7).
Burden-basket with vertical sides and carried usually by means of two shoulder-straps,	fe' pickalyī, fe hi'nū pickalyī e' pickalyī (pl. XCII, 8).
Square-sided, temporary burden-basket of hoja de chapil,	kūla' pickalyī, kūla'pō pickalyī, (pl. XCII, 5).
Common cylindrical basket,	picka'lyī (pl. XCII, 1, 3).
Hamper-shape basket,	pū'*te* (pl. XCIII, 2, 5, 6, 10, 11).
Bottle-shape bait basket,	tū'ñūtcītcī, dyūñūtcī'tcī, (pl. XCIII, 3).
Tubular basket used for spindles,	tcūrūkū'kū, tīwōtcī'tcī (pl. XCIII, 8, 12).

In addition to this classification, in which baskets used for certain purposes are of special forms, there are other terms indicating use which are applicable to a basket of any form, material, or technic. For instance, the name pū-pickalyī, from pū'ka, "fruit," and picka'lyī, "basket," may be used in speaking of any basket in which fruit is carried or stored.

As indicated in most instances by the names in the

above tabulation, these several distinct forms of baskets have special uses. The four types of burden-basket are used almost exclusively for carrying heavy loads upon the back. The two types made of hoja de chapil are, as above stated, only for temporary use and are worthless except while the leaves are green. They are also sometimes used, even after they are dry and brittle, by the shamans in their medicine practices. The other two types, which are made of the very durable pitigua, are sometimes used as storage receptacles about the house when not needed for carrying burdens, which is their primary use.

The flaring basket, kū′bī (pl. XCII, 7), is carried by means of a single band provided with a special, wide head-band that passes across the top of the head as the bearer bends forward. This is primarily a woman's burden-basket and is used in the daily home life of the people for bringing fruits and other products from the fields and in a multitude of other ways. It is, however, rarely used in carrying wood, which is so often one of the most important functions of burden-baskets among aboriginal peoples. Wood is usually brought by the canoe-load from some point near the river where a suitable dead tree can be found.

The straight-walled basket, fe′ pickalyī (pl. XCII, 6, 8), is made especially for carrying burdens considerable distances, as on long trail journeys into the interior. Within their own territory these baskets are rarely needed by the Cayapa, since practically all travel is by canoe. Such a basket is provided with two burden-bands attached near the top and the bottom respectively,

and so placed that the broad bearing surface of each band stands vertically. These bands pass across in front of the shoulders after the manner of the straps of a knapsack. In the case of a large basket, such as that shown in pl. XCII, 8, the cords of the burden-bands pass round the basket to give the load greater security. Further, to add strength, and especially rigidity, to such a basket, two palm-wood rods are placed vertically on the inner surface of the basket, each being so placed as to be directly at the line along which one of the burden-bands is attached. The band is made to take a turn round this rod at each point at which it is attached to the basket. These rods are also of particular service in preventing the cords of the burden-bands from tearing out the relatively slender elements with which the weaving is done, when the basket is used in carrying such a load.

What is here termed the common cylindrical basket (pl. XCII, 1, 3, and pl. XCIII, 4) has no special use other than as a general storage receptacle for foods, etc. Such baskets are frequently kept in the loft or hung under the eaves of the house when containing articles only occasionally needed.

Perhaps the most useful basket of all those made by the Cayapa is the hamper-shape basket, pū′*t*e (pl. XCIII, 2, 5, 6). This basket serves a variety of uses, chief among which are the storage of clothing and other valuable articles, and as a traveling case. No Cayapa enters on a journey of more than a day without one of these hampers, in which are his mosquito canopy, clothing, face-paint, any jewelry he does not wish to wear, and

any other articles of value he does not deem it safe to leave at home.

These hampers, especially when used in traveling, are tied about the middle with a cord or a woven band, and can be tumbled about without danger to their contents. They are frequently kept filled with articles in storage in the loft of the house, and often are suspended by the above-mentioned cord or band from the rafters or from one of the timbers at the eaves. Sometimes these baskets are made for special purposes. This is the case with the long one shown in pl. XCIII, 2, which was made especially for the storage of spindles, though the usual spindle storage-basket is a long tubular one like those shown in figs. 8 and 12 of the same plate. Another special form is the very small hamper-shape basket, such as those shown in figs. 15–17; these are used as receptacles for trinkets.

The bottle-shape bait basket, tū′ñūtcītcī (pl. XCIII, 3), is a very specialized form and, as its name implies, is made for the particular purpose of carrying live insect bait in the canoe while fishing. Its narrow neck is provided with a balsa stopper or with some leaves made into a bundle which serves the same purpose.

Tubular baskets, called tcūrūkū̧′kū (pl. XCIII, 8, 12), are made especially for the storage of spindles, either full or empty. These baskets are usually from thirty to forty centimeters in length by from seven to fifteen centimeters in diameter. Such a basket is hung by one edge of its opening, so that it hangs at more or less of a slant. It is usually suspended from a rafter or other part of the house-frame near the eaves, within easy

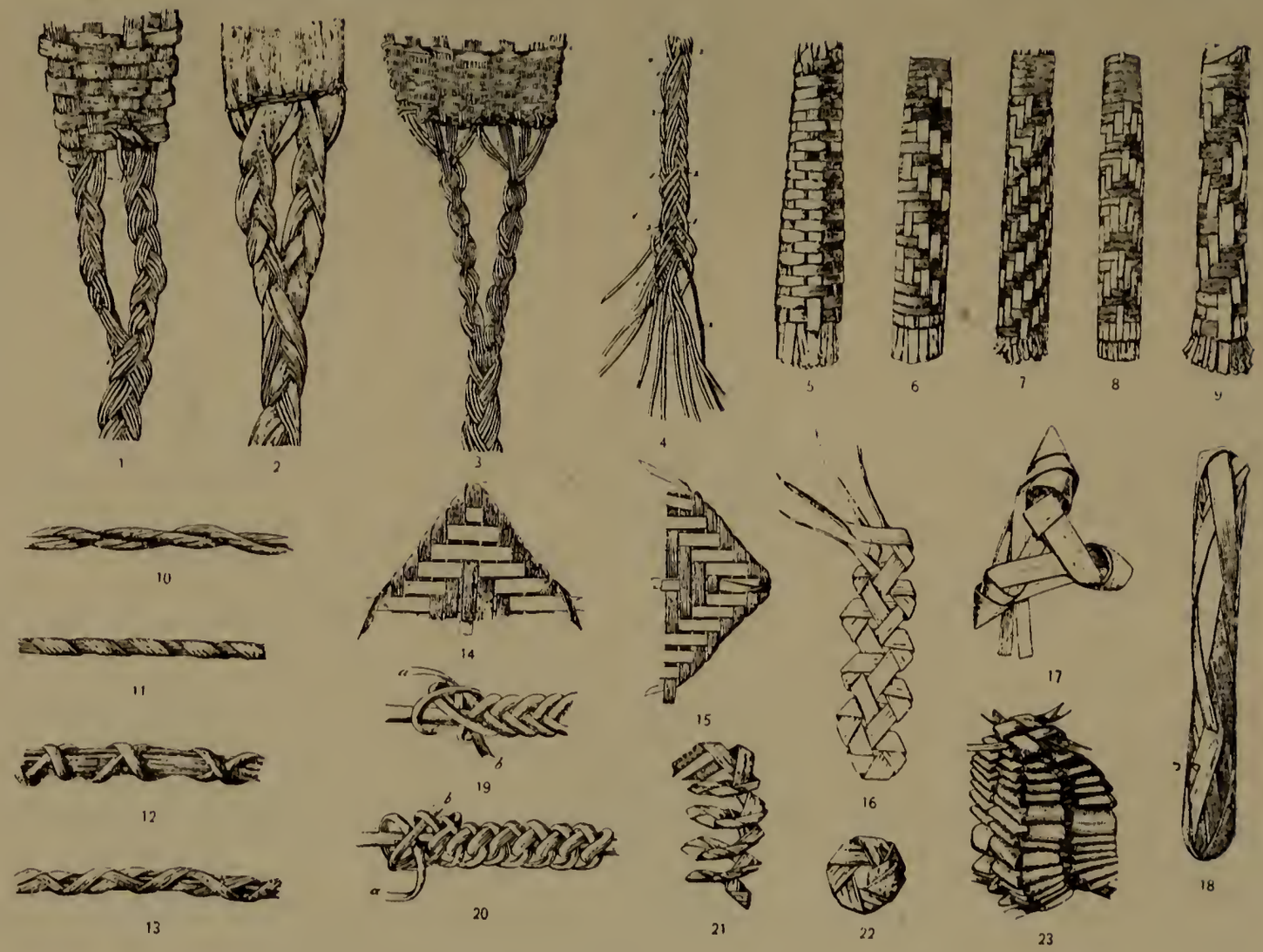
reach from the floor. The Cayapa women are very industrious, and whenever not occupied about the daily routine of their houses and fields, are spinning and weaving. The spinning tripod (pl. CVIII) is always kept in a convenient place at one side of the house, and one or two spindles are usually kept on the small woven shelf near the bottom of the tripod. All extra spindles, whether empty or filled, are, however, kept in these long tubular baskets. When several spindles are filled they are emptied by winding the thread into balls, in which form it is stored until needed.

One very special form of basket not mentioned in the tabulation above is the large bottle-shape basket shown in pl. XCIII, 7. This unusual basket was made as a cage for a chicken. As a rule, rough baskets of the usual cylindrical form are utilized for this purpose, the opening being closed by binding its edges tightly together with a pitigua cord. This bottle-shape basket was the only one of its kind encountered, and no Cayapa name was given for it.

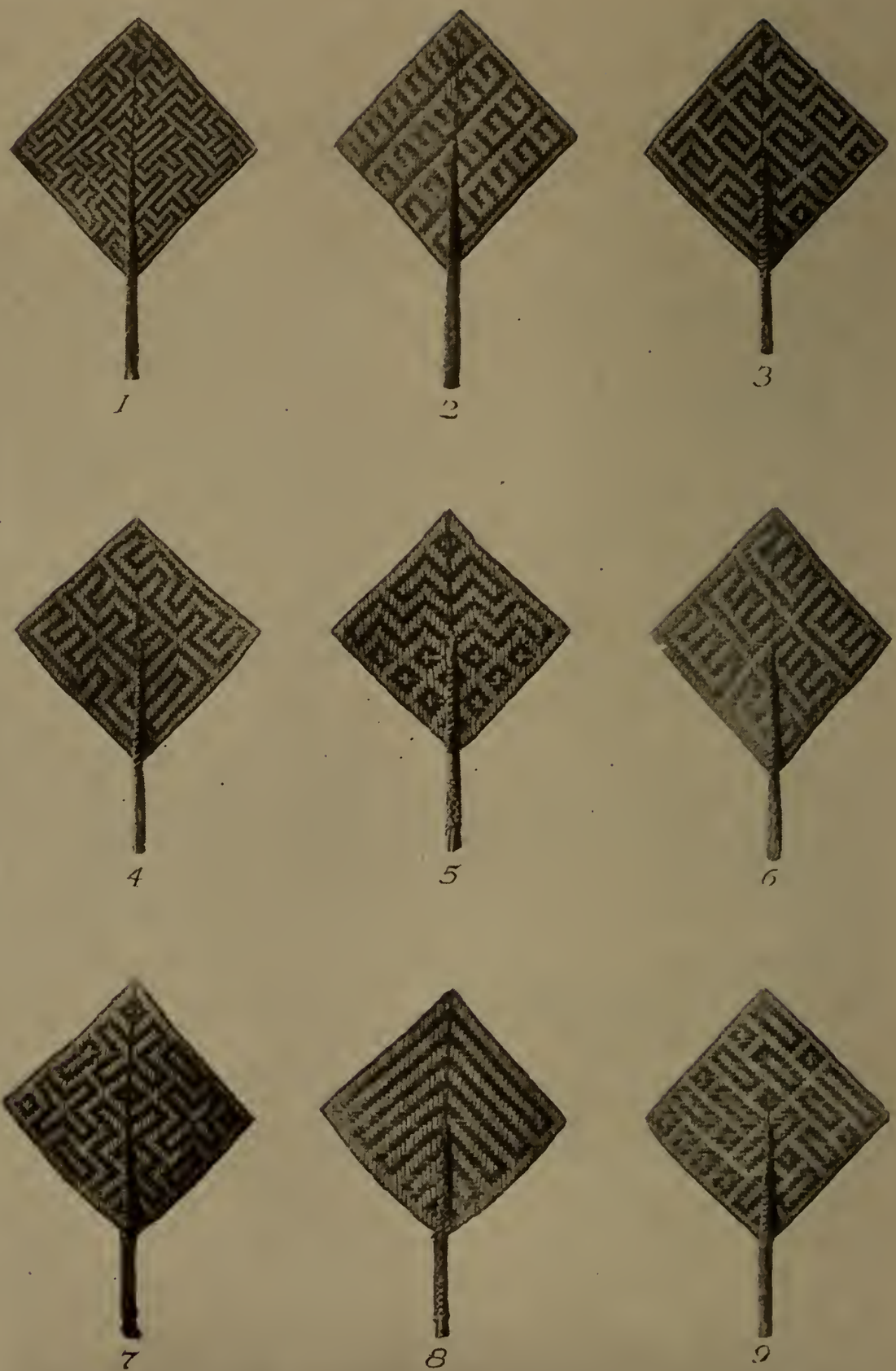
Basketry Handles

Most of the ordinary cylindrical baskets of small or medium size, regardless of technic, are provided with handles or bails such as those shown in pl. XCII, 3, and XCIII, 4. These handles are always of pitigua and are made in several forms.

The simplest handle consists of a plain piece of pitigua of the proper length, usually unsplit, tied at diametrically opposite points through the border of the basket. Usually it is passed through and brought up far enough



HANDLES OF BASKETS AND FANS, AND BURDEN-BANDS



FANS

to tie in a slip-knot, thus giving it a secure hold. In cases where no considerable weight is to be borne by it, however, it may simply be passed through the sides and knotted at each end.

The construction of five of the more elaborately made types of handle are shown in pl. CIII, 10–13, 19, and 20. In that shown in fig. 10 the construction is simple, an unsplit piece of pitigua being passed through the sides of the basket and twisted about itself after the manner of a two-ply cord, the ends of the pitigua being tied together.

The handle shown in pl. CIII, 11, is similar to the one just described, except that the pitigua is flat, and there is no attempt at twisting; instead, the second element of the handle is simply wrapped round the first. The two handles shown in figs. 12 and 13 of the same plate are similarly constructed save that there are two central elements while the wrapping elements are respectively two and three in number. In all these the sole endeavor appears to be to secure sufficient strength.

In the handle shown in figs. 19 and 20 of the plate, however, there appears to be a definite attempt at ornamentation, since there is added to the central section of the handle, which is otherwise a single unsplit piece of pitigua, an elaborately woven covering, as it may be called. One side of this, usually placed as the upper side, has a herring-bone appearance, as shown in pl. CIII, 19, while the other side appears as in fig. 20. The details of the construction are also well shown in these illustrations and need not be further described.

BURDEN-BANDS

The burden-bands made by the Cayapa are used almost if not quite exclusively in carrying the two types of burden-basket above described. These bands, called in general ta'ñla, consist in every case of two parts: the broad "head-band," called in Cayapa pickai ka'ñnū, and the two long cords which pass round the basket, called picka'lyi nō tetsūī pañnū. These burden-band cords are made in two technics: a plain braiding (pl. CIII, 1–3), called wa'tse'*t*a, and an elaborate technic which produces a cord, square in cross-section (pl. CIII, 4), called pī'Xta kalara, or bi'ñda kalara.

The Cayapa recognize four kinds of burden-bands. The simplest of these (pl. CIII, 2) is made of kuna-kuna bark and is called wa'tcī kīka tañla. A strip of this tough fibrous bark, from two to three inches in width and of a length equal to the total length of the burden-band, is selected and its ends are shredded so as to leave an unshredded section of the natural bark about twelve or fifteen inches in length in the middle. This forms the head-band, and at its two ends it is sewed across with a piece of pita string to prevent splitting. The shredded bark immediately adjacent to this section is then divided into two parts, each of which is braided separately for a few inches, after which the two are merged into a single braid which continues on to the end of the cord. These details are all given in the section shown in pl. CIII, 2. The outer surface of this bark is rough, but the inner surface, which is quite smooth and soft, is used as the bearing surface of the band. This particular type of burden-band is sometimes used

upon the forehead, but is more frequently employed as a shoulder burden-band.

A second type of burden-band is that shown in pl. CIII, 1, which is made of pitigua and is called by the Cayapa te'tsū tañla. In this the head-band is made in wicker with fairly broad strips of pitigua used as warp and a broad strip of the same material passing back and forth as woof. These warp strips are then split and made in two small braids that later merge into one larger braid as is shown in the illustration last mentioned. This type of burden-band is used almost exclusively in connection with the flaring burden-basket, which is supported by the band passing across the forehead. The remaining two types are made of the slender but very strong fibers of the palma real and differ one from the other only in the technic of the cord. In one instance this cord is simply braided, as in the kuna-kuna bark and the pitigua bands just described. A section of one of these bands called in Cayapa nintcū'a tañla, is shown in pl. CIII, 3. The other band, called lū'ra balya tañla, has a cord which is square in cross-section and is produced by the intricate technic shown in fig. 4 of the same plate. The head-band in each case is made in the same wicker technic in which several palma-real cords are laid side by side to form a unit warp element, and a couple of these same palma-real fibers are placed side by side to form a unit woof element.

FANS

The Cayapa make extensively a special type of fan, called nyē've or nyiwē'wi, used for fanning the fire and

to a certain extent for fanning themselves. As is shown in pl. CIV this fan is always square and has a substantial handle extending from one corner. Almost the only material used for fans is the bark of the petiole of the fan-leaf palm. On rare occasions the bark of the hoja blanca is employed, and such fans almost always show a pattern in red produced by coloring one set of the twilling elements with achote. Both these materials are prepared in exactly the same manner as in making basketry.

The blade of the fan is always made in the over-three and under-three form of twilling, while the handle consists of a bundle of the elements which form the blade, this bundle having an outer surface of twilling or wicker-work, as shown in pl. CIII, 5–9. Such fans are usually eight or nine inches square, though they are sometimes larger and frequently smaller. The larger fans are used almost exclusively for fanning the fire, while the smaller ones are used for giving personal comfort.

Fans are decorated with a considerable variety of geometric designs of the same character as those found on mats, and in lesser variety on twilled basketry. Pl. CV shows a number of these patterns, which in most instances are without special name and in no case are they symbolic, as has been pointed out in treating the decorative art of the Cayapa.

The exact manipulation of the splints used in fan-making is shown in pl. CIII, 14 and 15, which exhibit respectively the uppermost corner and the right-hand corner of the front or upper surface of the fan. In detail the manipulation is as follows: A single long

strip is bent double, always with its dark surface outward. Between the two splints which result from this doubling and at the point of the bend is passed a transverse splint with its lighter surface uppermost. Next another transverse splint is laid on top of this vertical double one, and the ends of the first transverse splint are bent over the second and passed down close to and parallel with the double vertical splint. In bending these ends from a horizontal to a vertical position they are simply turned over so that the fold in each case forms an angle of forty-five degrees with both its directions and the dark side of the splint is uppermost when the splint is given a vertical position. The third transverse splint is now laid on top of the original double vertical splint and over the two adjacent vertical splints made by bending down the ends of the first transverse splint. Next the ends of the second transverse splint are bent down over this third transverse splint. With this the first unit of three splints is obtained and the uppermost corner of the fan is made.

The next set of three transverse splints must now pass below the original double vertical splint. The first of this set passes below this double splint only. The next one passes below the double splint and the splint immediately adjacent on either side, and the third one passes under it and the two splints immediately adjacent on either side. As each succeeding horizontal splint is laid down, it is passed under and over the proper number of vertical splints required to produce the desired design. As each of these splints reaches the edges of the fan, the ends of the splint immediately preceding, which has

until now remained horizontal, are bent over as above described, and each of these ends forms another vertical splint passing down parallel to the original double splint used as a base in beginning the fan. Thus, while the transverse splints are all laid down with their white sides uppermost and facing the maker, when they are given this turn and pass downward at right angles to their former direction the dark side is brought into view. Hence all the transverse splints, when the fan is viewed from the side held uppermost in the weaving, are white, and all the vertical splints are dark. Thus, by causing the horizontal splints to pass in each case above or below the required number of vertical splints, the desired pattern is produced. These designs are, as above stated, always geometric, and the direction of their constituent lines is governed by the number of vertical elements crossed by the horizontal elements at the points where such direction changes.

By the addition, as above described, of as many horizontal splints as are desired, the upper half of the fan, which is a complete isosceles triangle the apex of which is a right angle, is formed. All the splints inserted in this upper half of the fan as horizontal elements become, by the above-described bending over, the vertical splints in the lower half of the fan.

When this upper half of the fan is finished, the last horizontal splint laid down is not turned over as in the case of the preceding ones. This splint marks the median line of the fan and is allowed to project horizontally out of its lateral corners until the blade of the fan is completed.

The second or lower half of the blade of the fan is woven in the following manner: The horizontal element next preceding the median element was, like all the remaining horizontal elements in the upper half of the fan, folded over and brought into a vertical position. It is now given a second fold and brought again into a horizontal position. This fold is in the opposite direction to that given it above: that is to say, when a horizontal splint is given its original fold into the vertical position, the splint is folded over toward the operator, which brings the vertical portion of the element on top of the horizontal portion. When it is folded the second time and brought from the vertical again to the horizontal position, it is bent back away from the operator. This returning of the element from a vertical to a horizontal position is illustrated in pl. CIII, 15, which shows the right-hand corner of the blade of a fan. Thus each element which starts in a horizontal position and then becomes vertical in the upper half of the fan, regains its horizontal position in the lower half.

Its manipulation in the lower half of the fan is precisely the same as that in the upper half, and by the selection of the proper numbers of vertical elements over and under which it is to pass, the required design is produced in the lower half just as was done in the upper half. Each end of any given splint is bent over in the above described manner, and the two ends of any certain splint which was originally horizontal in the upper half pass back directly toward each other and together form the horizontal element in the corresponding position in the lower half of the fan. They meet along the vertical

middle line of this lower half, the end of each one projecting several inches out of the side of the fan. The end of one half of such a horizontal unit passes out on the front surface of the fan while the end of the other half passes out on the rear surface.

Thus, when the successive vertical elements are turned back into the horizontal position, as above described, and carried through the twilling until they reach the middle line of the lower half of the fan, there is left on each surface of the fan, when this lower triangular half is finished, a set of these projecting ends which is equal in number to that of the original horizontal elements used in making the upper half of the fan, minus one, which is the last horizontal element inserted. This, it will be remembered, was not turned down to form a vertical element as were the others. On each surface these ends project alternately toward the right and toward the left. Those on the front of the fan have their white surfaces uppermost; those on the rear have their dark surfaces uppermost, and it is from these two sets of projecting ends that the handle is woven. In the upper half of the fan, the original double vertical splint is kept as a unit, its two parts passing together above or below the transverse elements as if they were one. On the completion of the first half of the fan, however, these two are divided, one being passed down the front, the other down the back. These two now become the centers upon which the two sides of the handle are woven.

Taking first one side and then the other of the fan, the handle is woven in the following manner (fig. 24):

The uppermost projecting end of the set of horizontal elements, that is, the one at the geometric center of the fan, is first bent directly back upon itself so that it projects in the same direction as the one immediately below, which in turn is bent back upon itself so that it projects in the opposite direction. As each of these splints is bent over, one of the halves of the original

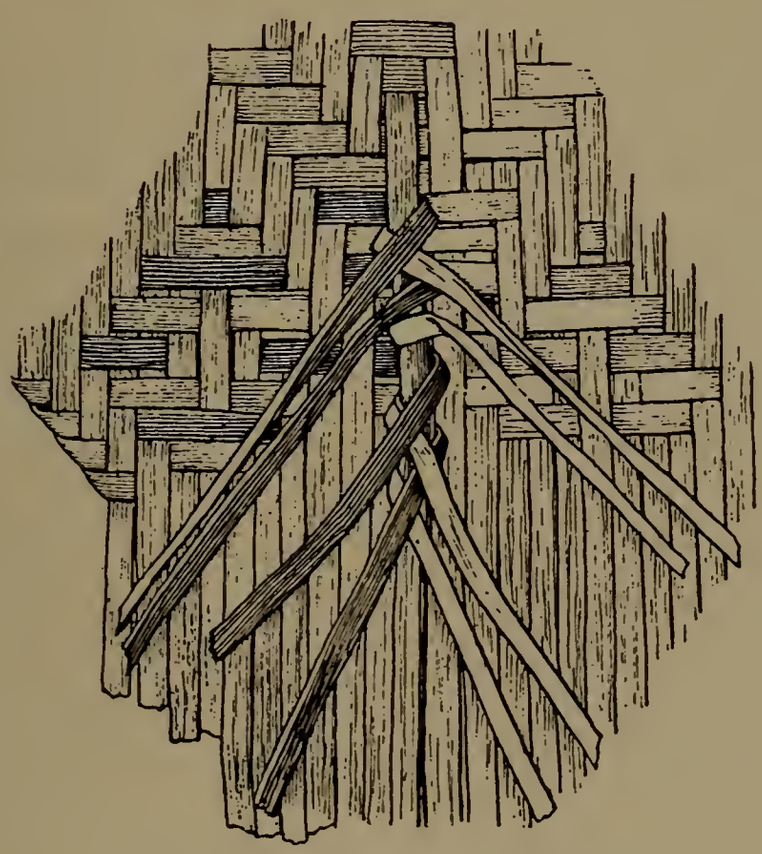
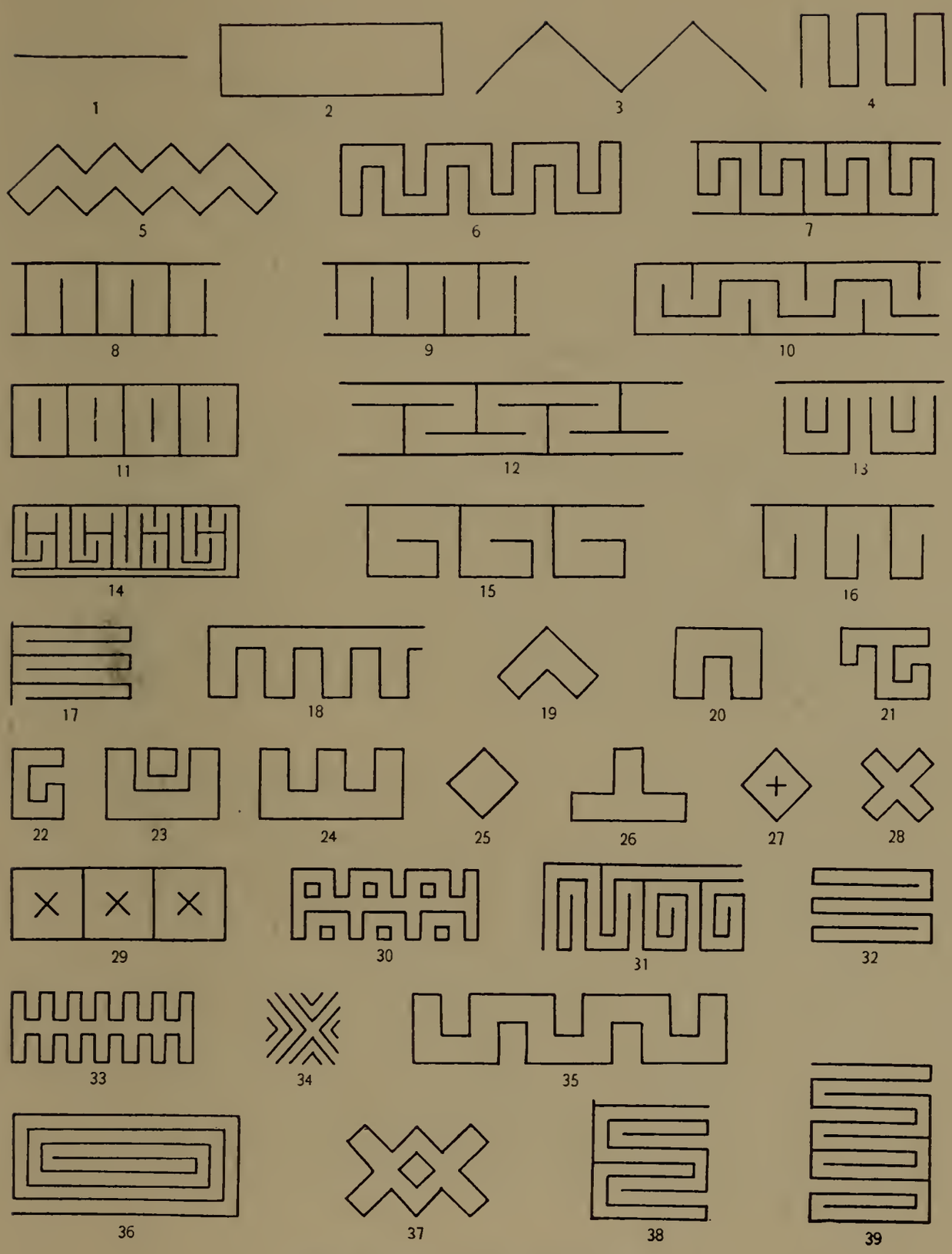


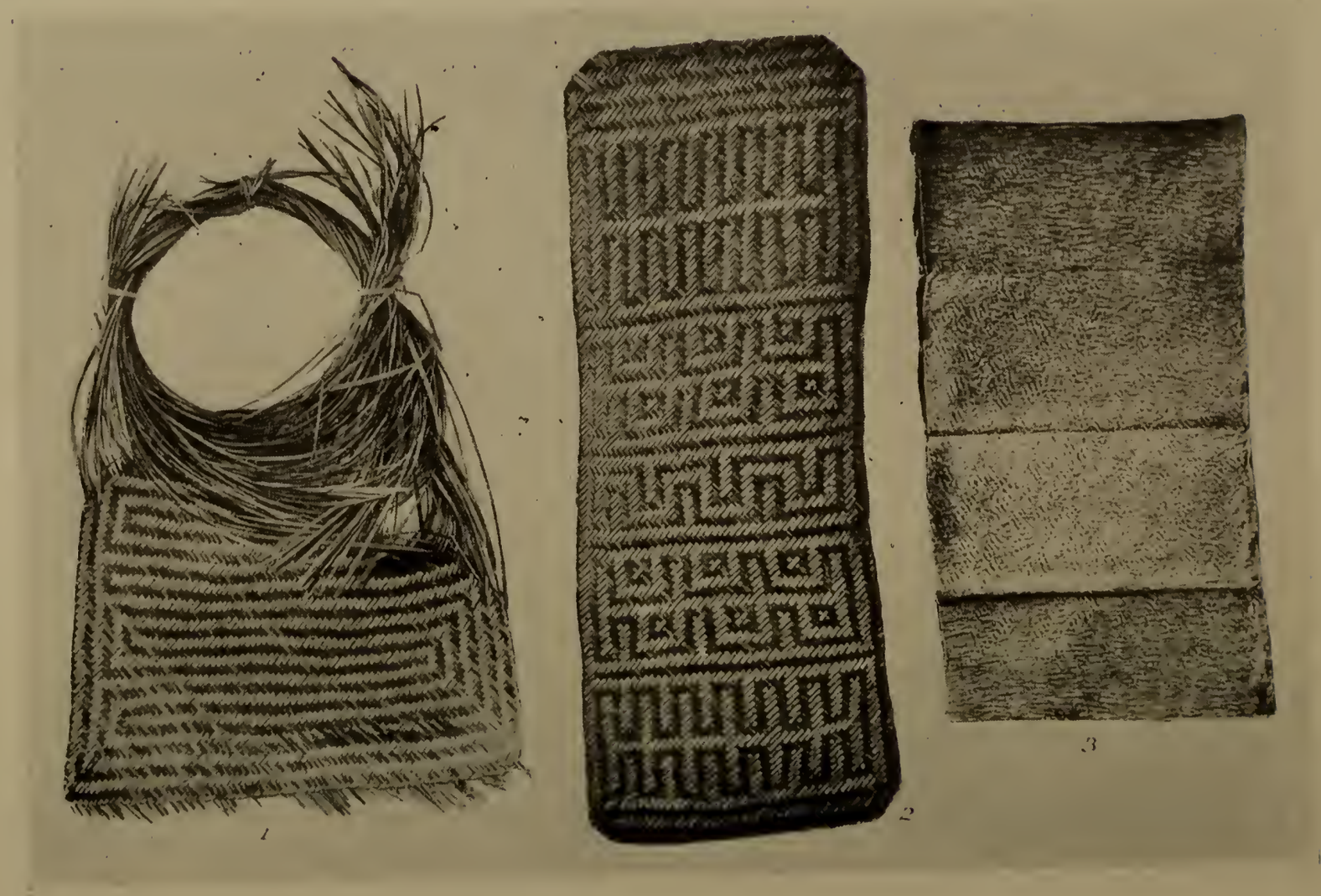
Fig. 24.—Details of fan technic

vertical element is included in the fold. The first end is next bent directly downward in the same manner as were the ends of the splints along the sides of the fan. The third end is then bent over so as to include the single strip of the original vertical element and the end which has just been bent down as above described. The end of the second element is then bent down into a vertical

position and the end of the fourth is bent across the three vertical elements of the handle thus far produced. The end of the third horizontal element is now bent down into the vertical position and across the fourth which was bent over as just described. Next the fifth horizontal element is bent across the bundle of vertical elements so far produced, and the fourth is now bent down across this fifth and into the vertical position. This process of bending first one element and then another into the horizontal and later into the vertical positions as above described continues until the lower point of the body of the fan is reached. By this time the ends of all the elements which were formerly projecting horizontally along the middle line of the lower half of the fan are bent into a vertical position and form a large bundle of splints, which constitutes this section of half the handle. These are now tied securely to prevent them from loosening. The fan is then turned over and the other half of the handle is made in the same manner by means of the ends of the horizontal splints which project on the other side of the blade of the fan. Having now completed the weaving, or plaiting, as it may more properly be called, of the two halves of the handle from the center of the blade of the fan down to its lowest point, the stem of the handle, or the part projecting below the lowest point of the blade, is made. Ordinarily the end of one of the last of these elements used in making the portion of the handle above described is wrapped several times tightly around the bundle of vertical splints above mentioned. This is usually an element that projects on the side of the fan which has



MAT AND FAN DESIGNS



MATS AND BARK CLOTH

been held uppermost in the weaving of the square blade itself. After this binding certain of the vertical splints are selected and the rest of the surface of the handle is covered by the ordinary twilling process or by wickerwork. In this a single splint is passed spirally round and round the handle, the requisite vertical splints being passed above or below this spiral in order to produce the desired design. In order to hold firmly the weaving at the end of the handle, those vertical splints used as the warp elements in the twilling or wickerwork of the outer surface are bent over and passed up along the surface of the handle. This is done before the handle is completely woven to its end, each of the doubled splints being used as a single element. The last turn of the spiral above mentioned passes through the folds of these vertical splints which are then pulled tightly so as to hold it and the remainder of the weaving firmly in place. This method of finishing the end of the handle by means of bending over the vertical splints is exactly the same as that employed in finishing the borders of all baskets of the wicker technic. Examples of these handles are shown in pl. CIII, 5–9. The last four are finished in twilling, while the first is in the wicker technic.

On completing the blade of the fan, and usually before the handle is woven, the last inserted or medial horizontal splint, which, it will be remembered, was left to project out of the corners of the fan, is turned directly over and passed back along itself. If this splint were simply bent over it would bring its dark surface uppermost and would cover a portion of the white surface of

this middle horizontal line. However, a half-twist is given this element so as to bring its light-colored surface uppermost, as is shown in pl. CIII, 15. It is then passed on along itself and follows the same course it did originally, passing under and over the same vertical elements and thus maintaining the symmetry of the pattern. The ends of these returning sections are cut off, so that they are hidden under some of the transverse elements under which they pass and thus the smoothness of the finished surface is not interrupted by the appearance of the ragged ends of these elements.

MATS

Mats, called tya′pū, regardless of size and use, are made of the bark of the petiole of the fan-leaf palm, and are of the ordinary over-three and under-three twilling. Their designs are identical with those found on fans, although they are not so varied as the fan designs.

As is done in beginning a hamper-shape basket (page 202), one of these mats is commenced by laying down two sets of splints and crossing them along a line which gives the desired width of the mat. This line is ordinarily a short distance from what is intended to be one end of the finished mat. A short section of each long splint lies on one side of this line, while the greater part of it extends outward in the opposite direction. After having woven a few courses under and over three, the one end of the mat is finished off. This is done by taking the short ends of the elements and weaving them to the point desired as the edge of the mat, where one set of

the elements is turned at right angles to its former course and passed in and out for a short distance along the same course taken by the other set of elements. This other set simply projects from the edge of the mat and is later cut off. An unfinished mat is shown in pl. CVI, 1. This shows the method of finishing off the first end and also of weaving a section of the body of the mat. Owing to the extreme length of the elements used in this mat it was necessary to coil them up in order to reduce the size of the object for shipment. As the mat is being woven these two sets of elements project out at right angles to each other in the form of a large V. In the case of such a large mat the elements used are often as much as fifteen or sixteen feet in length.

In weaving a mat, half of the elements, that is, all those passing in a given direction, have their light-colored surfaces turned upward; the other half, those passing in the opposite direction, have their dark surfaces upward. Now, in making the edge of the end of a mat, if the elements of the set whose light surfaces are uppermost are chosen as the ones to be turned and passed back as the binding, this turn brings the dark surface of each of these elements upward. These dark surfaces, therefore, superimpose themselves upon the dark surfaces of the elements of the other set along which they lie, since these short ends are passed over three and under three along exactly the same course as that taken by the set of elements which originally ran in the opposite direction. The same pattern is thus maintained. Ordinarily these short ends are run back over two courses of transverse splints, or a distance equal to the width

of twelve splints. They are cut off at their point of emergence from under the second transverse course. The splints of the other set, which, in the case above mentioned, are those which have their dark surfaces uppermost, are simply cut off at the edge of the end of the mat. Thus a smooth and solid end is produced.

In most cases the weaving is not carried to its fullest possible extent at the corners, but the elements which project out from each corner are turned back upon themselves and are passed back for the binding of the corner. They pass in the same direction which they originally had in the twilling, but are on the opposite surface of the mat. This gives the mat the appearance of having its corners cut off instead of giving it a sharp right-angled corner such as would be produced if the weaving had been continued to its fullest extent.

Each one of the long elements passes diagonally across the body of the mat and on reaching the edge of its side is folded over and passes back at right angles to its former course. It thus serves as an element of the other color and passes in the direction opposite to that which it had originally. When it reaches the edge of this opposite side it is again folded over. This brings its original color uppermost, and it takes a course parallel to that which it first had and at right angles to its immediately preceding course across the mat. Thus, in a very long mat such an element may go diagonally across three or even four times, as is the case in the large mat shown in pl. CVI, 2. On arriving at the opposite end of the mat, one set of these elements is turned under and passed back to form the edge at this point, and the

ends of all the elements are cut off in the same manner as was done in making the end with which the mat was begun.

Mats of this kind are most frequently used by the Cayapa in the hammocks which serve as cradles. A small mat is placed crosswise in the hammock and holds its edges apart; the baby is then laid upon this mat and swung in the hammock as a cradle. Large mats are occasionally used as beds, but for this purpose bark cloth is preferred. An important use for mats also is as a drying surface upon which to spread cacao. In canoeing, a large mat serves as a canopy or sun covering for small children or for an invalid. If its ends are placed just inside the gunwales of the canoe, bow upward, a mat forms a convenient and very serviceable canopy by virtue of its natural stiffness. An instance of such a use is shown in pl. LXXX.

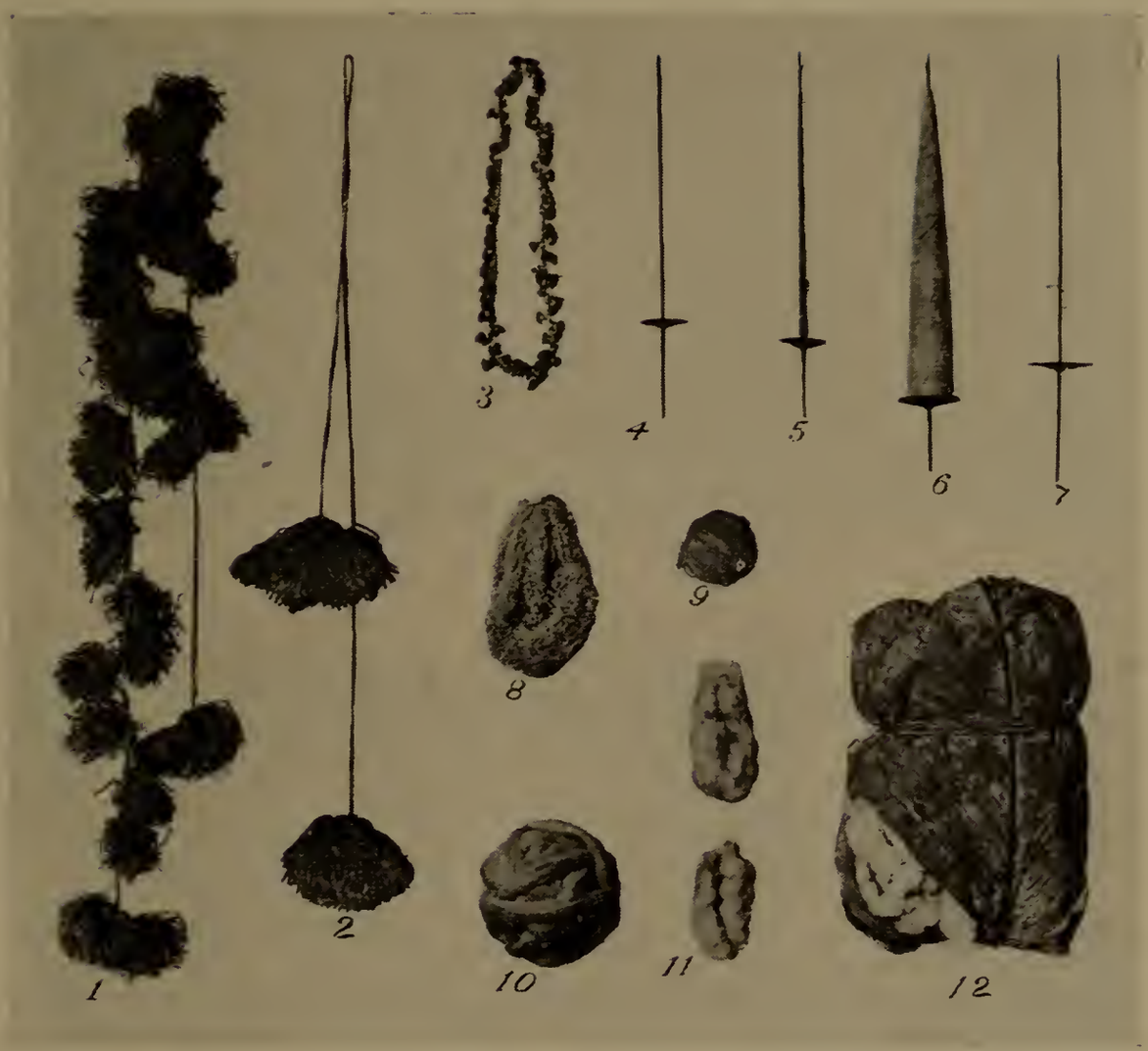
SPINNING

As was mentioned in speaking of agricultural products, the Cayapa raise considerable quantities of cotton, that is to say, all the cotton needed for weaving the cloth used for their mantas and clouts and for the belts used to hold the mantas in place. No one family raises any considerable number of plants, since a single plant produces almost continuously the year round and aggregates in the course of a year a considerable quantity of bolls. These plants are grown in any convenient place near the house or on the edge of a field of cane or of a grove of chocolate trees.

The cotton ordinarily grown in this section is of a brownish color, and it is claimed by the Cayapa that this is indigenous. It must be said, however, that brown cotton rarely grows wild along the river or in the mountains, but is seen almost exclusively about inhabited places or the sites of recently abandoned habitations.

The second variety of cotton is pure white and is also grown by the Cayapa to a limited extent. It is maintained that this is not a native plant, but is a direct importation from the mountain region or from the Rio Esmeraldas territory. In fact, this white cotton is now sometimes purchased by the Cayapa in their trips to the Rio Esmeraldas, because so little of it is grown along their own river.

When the cotton bolls open and the seeds with their covering of fine fibers are almost ready to drop, they are gathered and, if necessary, dried. The contents of two of these fully opened bolls are shown in pl. CVII, 11. It is frequently desirable to store the cotton away in this form for some time, in which event a considerable number of the bolls are made up into a package which is wrapped with a leaf or two of hoja blanca. Such a bundle is usually tied with a piece of pitigua and in this form may be stored for an indefinite period. In the bundle shown in pl. CVII, 12, a section of the wrapping has been torn away in order to show the contents. When it is desired to prepare the cotton for use, the bolls are cleaned of the seeds and of any foreign matter that may have become mixed with the fibers, since the presence of any foreign substance interferes materially with spinning. In this



GIRDLES, FILLET, AND SPINNING MATERIALS

1

2

SPINNING (1) AND WINDING (2) COTTON THREAD

cleaning process the fibers attached to a single seed may be disengaged from all the rest and flattened into a small, irregular, and very thin layer. These bits are later placed together and their edges overlapped in such manner as to form a very thin sheet of perhaps three by six inches. On the other hand, the contents of a single boll, comprising perhaps from a dozen to twenty seeds, may be separated together, in which case the resultant sheet of cotton is of about the same size as that mentioned.

These thin sheets are next laid away until a sufficient number is accumulated to make a roll. Each sheet is then worked over a second time to insure the absence of any particle of foreign substance. In this process each sheet is worked until it is so thin as to be transparent. The sheets also become very much larger, reaching usually about ten by fifteen inches in size. They are then carefully laid one upon another and pressed firmly together with the hands, care being taken that all parts adhere. The thickness of such a mat or wadding is about half an inch. This is then rolled crosswise into a cylinder about ten inches in length and from two to four inches in diameter. The cotton is now ready for spinning and is bound by one end of the roll to the top of a tripod spinning stand, called kō *t*e′le (pl. CVIII), or to a vertical pole if such a stand is not available.

Spinning is done upon a spindle (pl. CVII, 4–7), called kūtcū′a. It consists of a long, very slender shaft, called pī′tya′lyī, of palm-wood, and a discoidal whorl called pī′′pōka, of coconut shell or of hard wood, and

usually an inch and a half to two inches in diameter. The shaft itself is from ten to fourteen inches in length, but is usually no thicker than a large knitting needle. The spindle-whorl is ordinarily at a point about two or three inches from the lower end of the shaft, and it is this portion which is twirled by the thumb and fingers of the right hand. The thread is spun upon the longer end of the shaft. Frequently a piece of spun thread is wound tightly about the middle portion of this longer end of the shaft, as is shown in pl. CVII, 7. This is done in order to insure a firm hold for the thread during the spinning process.

The fibers of cotton always feed into the thread from the bottom of the roll, and in commencing to spin from a new roll a few fibers are worked from the outer lower corner of the sheet of cotton which forms the roll and are attached by pressure to the thread which is wound tightly onto the spindle shaft as above mentioned. As a result of the rotary motion of the spindle, these fibers are twisted together to form the thread, and, as they twist, the pulling of the spindle away from the roll of cotton causes other fibers to feed into the thread.

Having in this way started a few inches of the thread, it is manipulated with the left hand in such manner as to produce an even thickness by allowing it to pass between the first and second fingers which are made to exert a slight tension upon it, and by rolling it between the thumb and third finger in such a way that these combined actions pull where the thread is thick and allow it to pass freely through the fingers where it is thin. It is thus brought to a uniform size. This passing of the

thread between the first and second fingers serves also to prevent the fibers from feeding too rapidly, since a sufficient tension is kept upon them to regulate the amount of cotton which passes on to the rolling and final forming of the thread between the thumb and third finger, where it is reduced to its final and uniform size. Now and then an exceptionally thick place appears in the thread as it is formed, owing to an irregularity in the tension exerted by the first and second fingers or to some irregularity in the rolling between the thumb and third finger. In such a case the twirling is stopped, the left hand is slipped farther back on the forming thread, and the thick portion is rolled and pulled out until it is of the proper thinness. In pl. CVIII are shown two stages in the process of spinning. In fig. 1 the position of the hands during the actual twirling of the spindle and the regulating of the forming thread are shown. In fig. 2 the spinner is shown winding a section of finished thread on the spindle.

The twirling of the spindle is done with the right hand and in one of two ways: It may be twirled with the thumb and third finger, a notch formed by the ends of the first and second fingers being used as a support for the spindle; or it may be twirled with the thumb and first finger, in which case a notch formed by the ends of the second and third fingers is used as a support. In either case the thumb is held stationary and the rotary motion of the spindle is produced by rolling the first or end joint of the opposing finger against the ball of the thumb. In this manner a rapid rotary motion is given the spindle, which process, aided by the slow feeding

in of the fibers with the left hand, causes a fine and tightly twisted thread to be formed.

As the fibers are fed into the thread and it gradually lengthens, the right arm is extended farther and farther from the body and the spindle moves farther and farther away from the roll of cotton. At last, having reached a point where it becomes inconvenient to rotate the spindle, the motion is stopped, the angle between the thread and the spindle is changed so that the thread is nearly at a right angle to it, and the thread is unwound for a few turns, since in spinning it naturally winds out to the extreme point of the upper end of the spindle. The motion is now reversed and the full length of the thread to the point of completion is wound on the spindle, thus bringing the left hand again near the point of the spindle and permitting another section of thread to be fed to it. In winding the finished thread on the spindle the worker begins near the spindle whorl and winds it gradually upward along the shaft. In this manner the wound portion of the shaft gradually increases and approaches the point so that, when the spindle is full, a cone of thread with a base equal to the diameter of the whorl and a length equal to the full length of this portion of the shaft is formed.

In case it is necessary to discontinue spinning, the thread is simply disconnected from the roll of cotton by pulling loose the fibers at the point where the twist in the thread is complete. This leaves a small tuft of projecting untwisted fibers on the end of the thread. To resume spinning, it is necessary only to place these loose fibers on the roll of cotton and give them a slight twist.

As above mentioned, the fibers are fed into the thread from the bottom edge of the roll of cotton, which feeds the fibers evenly from one end of the sheet to the other. Thus, by beginning at the outer corner of the lower edge of the sheet and feeding the fibers evenly into the thread as they come from along the line of the coil made by this lower edge, the opposite end of this edge is reached. This point is at the center of the bottom surface of the roll of cotton, and when it is reached the direction of the pull of the thread is reversed so that it follows this coil back to the outer surface of the roll where its direction is again reversed and the original path is followed to the center of the coil. In this manner the fibers are not drawn from one side more than from another, hence the roll of cotton remains constantly cylindrical and is simply shortened evenly until completely exhausted.

Having thus filled a spindle, it is usually placed in one of the long spindle baskets (pl. XCIII, 8, 12) until such time as several spindles have been filled and it is desired to wind the thread into balls. Such a ball is illustrated in pl. CVII, 10.

In order that the thread may unwind readily from the spindle, this is held between the great and second toe of each foot. The short portion of the spindle shaft below the whorl is usually placed between the toes of the left foot, the opposite end of the shaft resting between the toes of the right foot. In this manner a reel is formed and the thread unwinds easily.

Thread is almost always stored in balls. The white and the brown thread is usually kept in balls from three to five inches in diameter. The green and the lavender

thread may also be wound into large balls, but because much smaller quantities of these colors are used the balls are usually smaller. Likewise the red and the blue woolen thread, which is obtained by trade through Indians of the interior mountain region, comes in balls an inch or two in diameter, such as the ball of red woolen yarn shown in pl. CVII, 9.

Threads of four native colors are used by the Cayapa. Two of these, the white and the brown, are the natural colors of the two species of cotton. The lavender is made by dyeing with a pigment obtained from a univalve procured at the ocean, while the green is produced by a dye obtained from the leaf of a small shrub resembling the locust of the temperature zone. In addition to these native colors the red and blue woolen threads obtained through trade with the Indians of the interior are used. In dyeing the cotton either lavender or green it is wound into short skeins, the winding being usually done upon the great toe of one foot and the thumb of the left hand as turning points. Another method is to drive two wooden pegs into a section of plantain or other succulent stem and wind upon these. The skein thus formed is tied at the two ends near the pegs to prevent it from becoming tangled. It is then slipped off the pegs and placed in the dye, and by rubbing and thoroughly working the dye into the skein, an even as well as a fast color is finally obtained. The skeins are then laid out to dry and are later wound into balls and stored away. Pl. CVII, 8, shows one of these skeins after the dyeing is completed.

Dyes of only two other colors are used by the Cayapa.

One is a jet black obtained by boiling the bark of a certain tree, and is used almost exclusively in the dyeing of old mantas or other pieces of cloth. The other is the red obtained from the achote and is used on rare occasions for coloring the material used in certain baskets and fans.

WEAVING

Weaving is always done upon a crude, though fairly elaborate, loom consisting of twelve essential parts. In pl. CIX is shown a photograph of one of these looms as it appeared in use in a Cayapa house. This shows the parts of the loom to fair advantage, but they are even more clearly shown in pl. CX. These parts are as follow:

Lateral uprights, *a*, *b*	=	a′ipala
Cross-bars of frame, *c*, *d*	=	tyūnlū′ra
Warp guides, *e*, *f*	=	ya′ipe
Weaving batten, *g*	=	tsē′hwa
Shuttle, *h*	=	pī′picalyī
Warp separators, *i*, *j*	=	yade′mbū
Head bar, *k*	=	yade′mbū
Head stick to which the initial line of weaving is fastened, *l*		
Width gauge, *m*	=	ityu′lya

The lateral uprights (*a*, *b*) are two long and comparatively slender poles. One end of each is forked, and each point of the fork is sharpened to a chisel edge. The points of each of these poles are forced through one of the narrow cracks in the palmwood floor of the house and across one of the joists below. The upper end of the pole is bound securely to one of the beams of the house,

usually near the eaves. The foot of the pole is placed far enough from this beam so that when it is bound to the beam it forms an angle of about fifteen degrees with the perpendicular, thus carrying the upper part of the loom at a slight slant away from the weaver.

A heavy horizontal bar (*d*), usually about three inches in diameter, is next bound to the upright lateral poles at a distance of from three to six inches from the floor, and a similar bar (*c*) is bound farther up the poles, its position depending on the desired length of the cloth to be woven. It is always placed at a distance above the lower bar about six or eight inches greater than half the length of the piece of cloth to be made; thus for weaving an ordinary manta the bars are placed about three and a half feet apart. Both bars are fastened to the poles with heavy pita cords, those holding the upper cross-bar being simply bound around the pole, and those holding the lower bar being tied in through the forks at the bottom of the poles. The upper bar hangs down automatically, but the lower one is brought into place by means of two stout pita cords which pass round both transverse bars. Such cords are employed also to hold the movable bars (*i*, *j*) used as warp separators. Especially is this the case when the loom is being set up and before the warp threads are wound on it. These two cords hold the cross-bars in position by crossing, and are so placed that they are near either edge of the manta as it is being woven. The two uprights (*a*, *b*) and the two heavy transverse bars (*c*, *d*) are what may be termed the fixed elements of the loom, forming a rectangular framework upon which the warp is strung and the weaving done with what may be called the movable elements.

LOOM

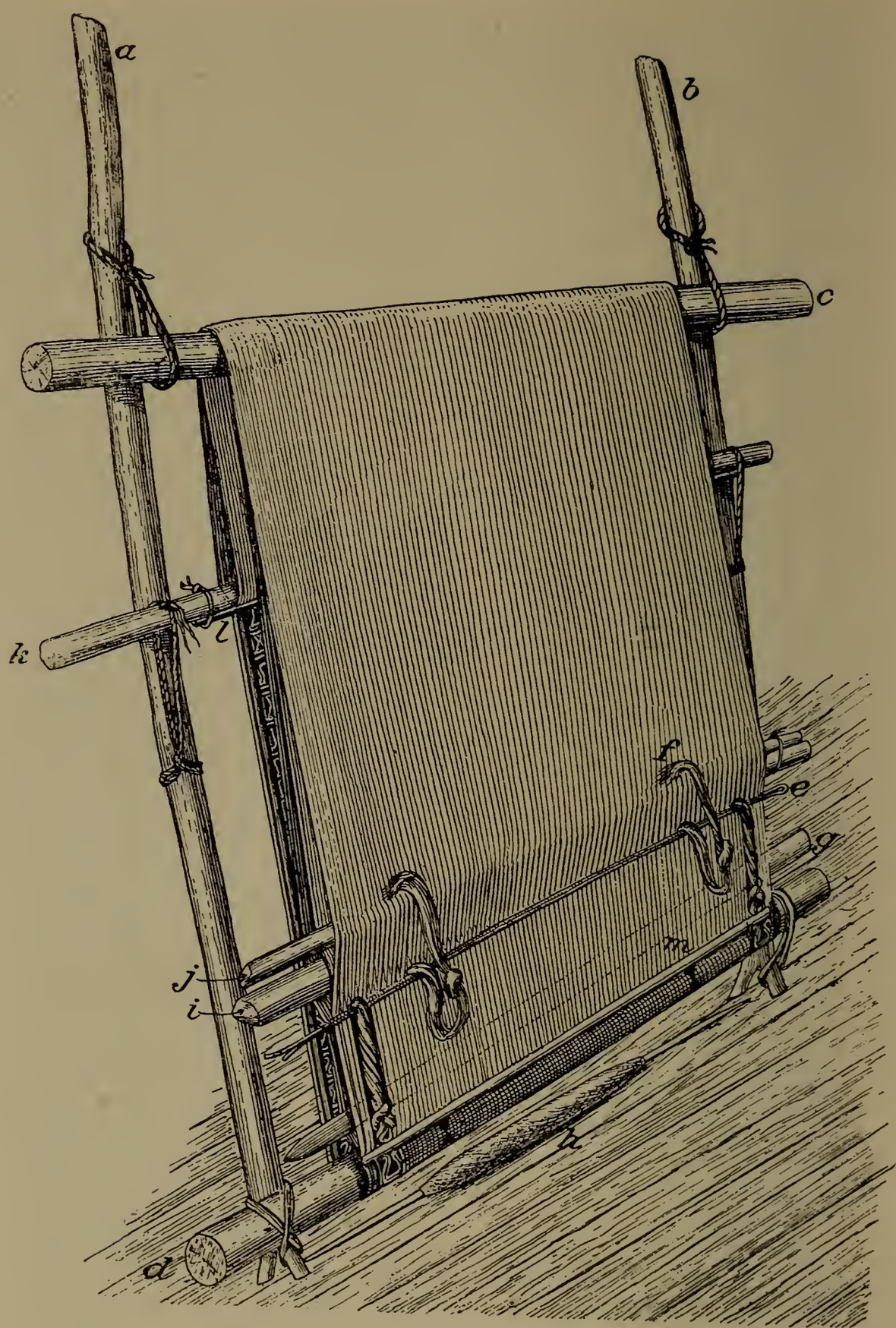


DIAGRAM OF LOOM

These active, movable elements are the two warp separators (*i*, *j*), the two warp guides (*e*, *f*), the shuttle (*h*), and the batten (*g*). The warp separators are fairly small transverse wooden bars, one usually somewhat smaller than the other, used in bringing to the front certain sets of warp strands as the weaving progresses. In certain cases where relatively simple designs are used, only one of these bars is required—the larger of the two is then employed. The warp guide (*e*) is employed in a similar manner; in fact this element consists chiefly of a long and fine pita string, which passes in and out of the warp strands and includes in its folds each alternate strand. As it comes to the front it passes round two flexible pitigua rods and thus forms a continuous line across the unwoven portion of the textile and serves, by virtue of the fact that in its folds are included each alternate warp strand, to bring to the front, as the pitigua rods are pulled outward, the warp strands which were at the rear when the shuttle was last passed through between the two sets of warp. On the other hand, since the horizontal rod *i* passes between these two sets of warp strands and has in front of it the set not included within the folds of the long string which forms *e*, the two work in opposition to each other, so that, when the warp strands controlled by *e* are brought forward, they may be again forced backward by rolling *i* down toward *e* sufficiently to carry back those controlled by *e* and bring forward those controlled by *i*. As above stated, the smaller rod *j* is not always used. When present, its function is to control certain strands of colored warp which it is desired to form into a design at regular intervals, such as an

alternation of small white and green squares. In mantas where such designs do not appear, the rod *j* is obviously not necessary.

While it is possible to control by such a rod as *j* the elements of a design composed of an equal number of strands at each insertion of the shuttle, and thus by a single downward movement of the rod to bring forward all the strands needed for several such lines of design, a special device, such as that at *f*, for sorting warp strands, is required in making more elaborate designs such as bird and animal forms and many geometric figures where varying numbers of warp strands are needed in different portions of the pattern. Such a device consists of loops of pita string, each including one of the colored warp strands used in making the particular set of designs under consideration. Having first manipulated the two portions of the warp in the general way provided for by the continuous string *e* and by the horizontal rods *i* and *j*, those particular warp strands used in making each one of the lines of especially elaborated designs must next be manipulated by a set of string loops such as those at *f*. This becomes simply a process of counting out the number of strands required for the particular part of the design in hand, this number varying as each different part of the bird, animal, or other pattern is reached. Having counted out and separated the loops containing the particular strands which it is desired to show at the front of the cloth, these loops are shoved down against *e*, the remainder being forced upward in order that they shall not interfere with the others when the two sets of strands are separated, which is done by simply

pulling upon those loops which contain the particular warp strands which it is desired to bring forward. When these are brought forward the weaving batten is passed behind them and the whole set of warp strands is properly separated and ready to receive the woof. This is accomplished by passing the shuttle through below the weaving batten, which is placed with its edges horizontally in order to separate the two sets of warp strands.

In threading up the loom, the warp threads are fastened to a thin, narrow, palm-wood rod (*l*). A heavier rod (*k*), on either side of which one-half of the warp strands pass, is fastened by means of loops to *a* and *b*, and bears the strain of the weaving as the batten is brought down with considerable force in order to drive down the preceding course of woof and produce a tightly woven piece of cloth.

The only remaining movable element of the loom, except the batten and the shuttle, is the width gauge (*m*), which is used to hold the manta to an exact width. This rod is made either of bamboo or of palm-wood, and is provided at either end with a single short and sharp point, which is stuck into the edge of the manta just below the line along which the weaving is being done.

The batten (*g*) is a flat piece of wood, usually about two or two and one-half inches wide, and of a length six or eight inches greater than the width of an ordinary manta, or about three and one-half feet. Its edges and point are much like those of a heavy double-edged sword, and both the edges and the point are fairly sharp, thus permitting the point to be inserted easily between the warp strands and also allowing a direct and forceful blow

to be struck along the full width of the textile with the edge of the sword. These swords are always made of the wood of the quende tree. This is a reddish, very hard and durable wood, the surface of which is made extremely smooth with the leaf, lya'pic hakī, which is used especially for smoothing wooden objects. The quende is a rare wood in this region, and the battens are, on this account and also by reason of the difficulty of their manufacture, highly prized by the Cayapa. In fact, the batten or sword is the only part of a loom which it is at all difficult to make and which cannot be easily replaced if broken or lost.

The shuttle is simply a cylindrical double-pointed rod of palm-wood, about half an inch in diameter and of a length slightly greater than the width of the cloth. Upon this rod is wound the weft. Beginning near the middle, the first winding is done in a space of six or seven inches along the middle of the shuttle. In passing the thread from one end to the other of this wound section, approximately a half-turn of the shuttle is made, the thread being given a complete turn about the shuttle at the end of the wound section, then being passed back with another half-turn to the opposite end of the wound section where another complete turn is given to hold it in place. So the winding proceeds back and forth from end to end of this middle section, each time the turn of the thread at the end of the section holding it from slipping. The wound section gradually increases in length until, when the shuttle is completely wound, it measures twelve or fifteen inches and forms at the middle of the shuttle a cigar-shape section from an inch to an inch and a half

in diameter. Since the thread is very fine, a great length may thus be wound on a single shuttle.

In setting up a loom, the upper horizontal bar (*c*) naturally falls into its proper place, but the lower bar (*d*) must, as above mentioned, be brought to its place by two pita strings, which pass from *d* to *c* and which serve also to hold the movable rods *i* and *j*. In inserting the movable rod *i*, the string which naturally comes at the front passes back of *i* and the one which naturally comes at the back passes in front of it, thus forming a sort of double figure eight. This holds the rod *i* in position, but at the same time admits of its movement up or down as may be desired. The rod *j* is similarly held. In this condition the loom is ready for threading.

Balls of warp thread of the desired colors are selected, white or brown cotton being used as the background, and lavender, green, red, and blue for working out the designs. In every case the warp elements are those which are visible and which produce the designs, and the stringing of the warp upon the loom requires considerable care in order to get the desired colors in the proper places and to get just the right number of warp strands in any given band. In stringing the loom the threads are wound round and round the two horizontal bars, *c*, *d*. The back of the loom when threaded appears as a sheet of fine parallel threads with nothing inserted among them. The front, on the other hand, presents a very different appearance, for in this winding every other thread passes behind the movable bar *i*, while the remaining threads pass in front of it. In this way *i* divides the front sheet of threads practically into two sections of equal numbers.

This is not strictly the case, however, for along those lines where it is intended to work out an elaborate pattern all the colored warp strands are passed back of the bar *i*.

Having completed the threading of the loom in this manner, two pieces of the flexible pitigua are obtained, together with a ball containing a very long and fine pita string. With these the guide *e* is made. The string is passed in and out between the adjacent warp strands upon the front surface of the loom, so that the warp strands in the rear half of this front sheet, that is, those strands lying back of the transverse bar *i*, are included, each in a separate turn of the string as it passes back between the warp strands that lie in the forward half of this sheet and again comes to the front. Each time this string comes to the front, it is wound in and out in the shape of a figure eight over the two flexible pitigua rods, the two rods being included in the loops of the eight. This holds the string firmly along this line at the front and permits it to pass back and to include another of the rear warp strands, after which it again comes to the front and repeats this course until the entire guide (*e*) is completed. As above stated, in weaving it is necessary only to pull forward upon these two transverse pitigua rods with their attached string to bring forward all the warp strands at the rear of this front sheet or set and pull them completely through, each individual strand passing between the adjacent warp strands lying in the front part of this set. Thus the strands which were at the rear now become the front strands, and those which were at the front become the rear strands. The lateral pressure of the strands upon one another is sufficient to hold

WOVEN FABRIC BEING STRETCHED

MANTA OR SKIRT

them in place when once they have been drawn forward, thus when it is desired to bring forward these rear strands, the transverse pitigua rods of *e* are pulled forward and the batten is inserted between what then becomes the front set of warp strands and those which are then at the rear. This sets the entire warp in the proper order for producing this certain course in all those simple designs which do not require special sorting of the warp elements.

By the use of the guide *e*, as above mentioned, the relative positions of the warp strands were reversed so that those which were originally at the rear and which passed back of the guide rod *i* are now at the front, and vice versa. Obviously, therefore, when it is desired again to reverse the relative positions of these two sets of warp strands, it is necessary only to bring the bar *i* down, which is always done with a rolling motion, thus gently forcing the strands that passed back of the bar, but which are now in front at the point where the shuttle and the batten were last inserted, again to the rear and bringing those which are now at the rear but which formerly passed over the front of the bar *i* again to the front at the point where the shuttle and batten are next to be inserted. By the use of the rod *i* and the guide *e* in this manner, it is of course possible to bring forward alternately the two sets of warp strands in a wholesale way, as they are required in the weaving.

If a perfectly plain piece of cloth were woven in this manner, no devices for shifting the warp other than the two above mentioned would be necessary, since no difficulty would be encountered in the matter of designs. A fairly simple device is used in those cases

where certain regular alternations only are needed. This is a smaller bar (*j*) which controls certain of those strands that pass in front of the bar *i*. This bar (*j*) has no connection with the rear set of these strands. Now, when all the strands passing in front of the bar *i* are forced to the rear by pulling the guide *e* and its set of warp elements forward, those certain strands of the set which pass in front of *i* but which are needed forward, are brought to the surface by rolling *j* down over *i* to a point where it is possible to insert the batten so as to bring these few elements to the front.

Where still more elaborate designs, such as complex geometric figures, animal and bird forms, and others, are desired, it is necessary each time to sort out by hand the special warp strands needed for the particular line of design then in hand. As above mentioned, the transverse bar *i* divides the set of warp strands into two groups approximately equal in numbers, the alternate strands passing respectively in front and behind the bar. All those colored warp strands, however, which are used for these more elaborate designs pass to the rear of bar *i*, and in order to sort these out and bring them forward as needed, a device (*f*) similar to that used in connection with the two transverse pitiguas in *e* is employed, though in this case the individual threads catching the warp strands are much longer. The threads employed in the guide *e* and which are used to bring the whole rear section of the warp to the front, are not attached to the particular strands controlled by *f*. The longer threads of *f* pass about these, and these only. Thus, after those strands which are controlled by *e* or those controlled by *i* have

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been brought into their proper position and the warp set in a general way for the particular line of weaving in hand, the bunch of long strings comprising *f* is taken up and are sorted out. They are counted off and the ones attached to those particular warp strands which it is desired to bring to the front are passed downward, the remainder being passed upward to a distance of several inches from the former. Having arranged one after another of these sets of warp strands, and having thus set in proper order the particular strands which are to be brought to the front, the pointed end of the batten (*g*) is inserted and passed from the right toward the left. Those particular strands controlled by the strings of *f* which are needed at the front are pulled forward with the left hand as the batten is inserted. No attention need be paid to any of the remainder of the warp strands as the batten is inserted, since these are automatically controlled by *e*, *i*, and *j*.

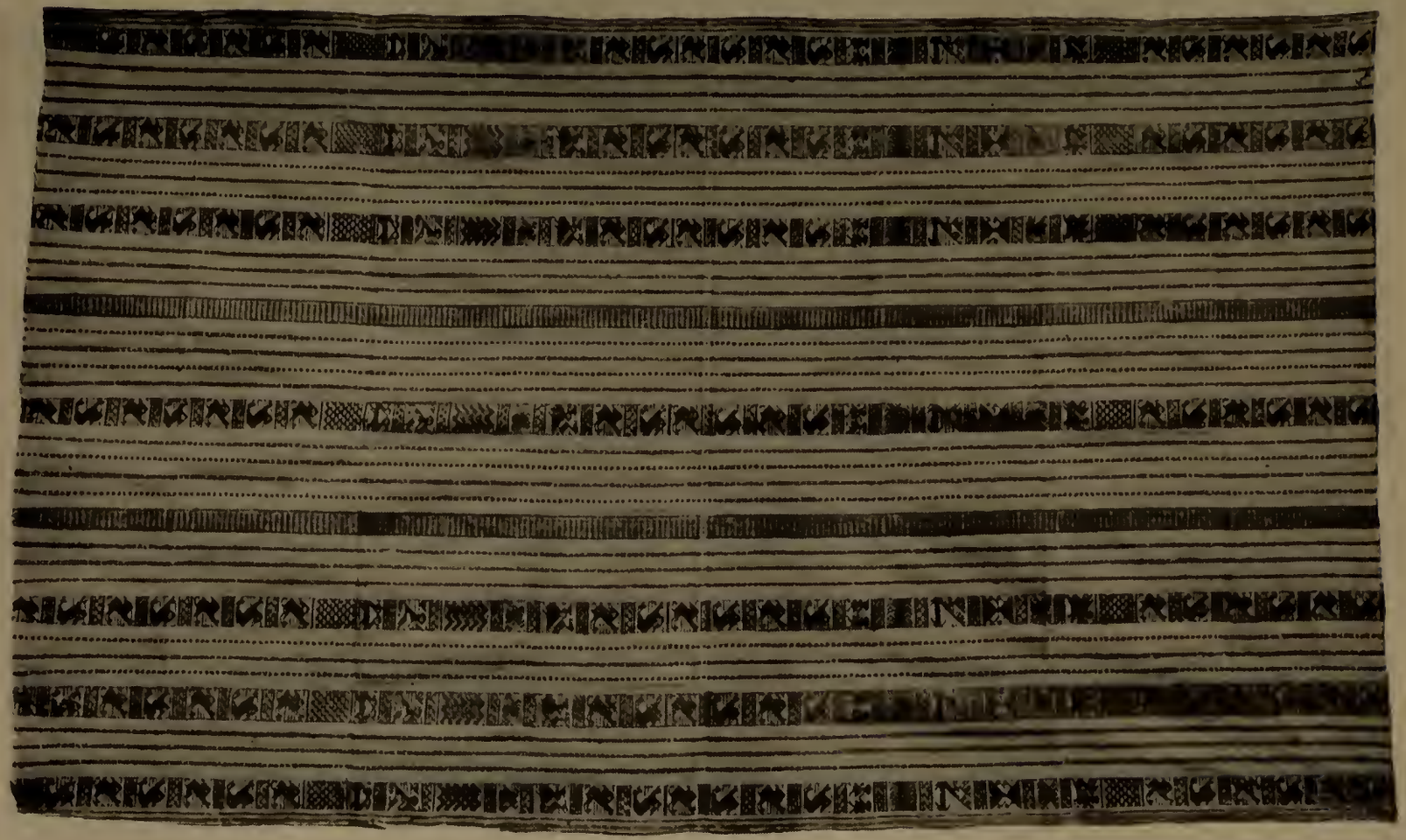
Having thus properly inserted the batten, it is grasped at each end by one hand and is brought down several times with forceful and even blows, thus driving the warp strands, each pair of which crosses above the preceding horizontal weft element, down very closely upon it. The batten is then raised three or four inches and so turned that its flat surface lies horizontally. This spreads the two sets of warp elements apart and the shuttle is passed through between them, thus bringing another of the fine weft elements into position. This weft element is pulled very carefully into its place and given just the right tension, since any undue amount of tension upon it, or on the other hand any undue laxity,

would cause an unevenness at the edge of the textile, or, what would be worse, a series of these might cause a puckering or a gaping at some point in the textile body. The batten is then withdrawn and the warp elements are crossed above this new weft element, and are set in their proper positions by means of the devices *e*, *i*, *j*, and *f*, as above described, after which the batten is again inserted and brought down edgewise with its forceful blows to drive firmly the new crossing of the warp elements down upon the newly inserted weft.

From the above description it will be seen that the patterns of Cayapa soft textiles are formed entirely by the warp elements, the weft being almost entirely invisible in the properly made cloth.

There is but this one cloth technic among the Cayapa, the only approximation to a variation of this being in those designs where a diagonal line is desired, in which case there is an arrangement of the elements that approximates twilling.

As before stated, the loom is so arranged that its lowest part is not more than four or five inches above the floor, and it is upon the lower portion of the loom that the weaving itself is done. The weaver sits, tailor fashion, upon a piece of bark cloth only, or sometimes upon a very low stool, and weaves a section of cloth eight or ten inches in height, after which the lashings of the rod *k* are loosened so that the work may be slipped around as would an ordinary band upon the two transverse bars *c* and *d*, thus bringing the last line of the work down almost to the bar *d* again. Keeping the work low in this manner has a double advantage: it is easier to



MANTA OR SKIRT

strike a forceful blow with the batten if it is struck at a point somewhat below the level of the shoulders, and it is easier to manipulate the several devices, *e*, *i*, *j*, and *f*, used for controlling the warp elements. Thus, by a series of such readjustments, the line along which the weaving is being actually done is kept uniformly low, and the labor therefore rendered as easy as possible. This continues until the proper length of the textile has been reached, when the two ends of the woven section are usually about a foot apart, the loom having been originally set up with this allowance. A narrower section of unwoven warp strands it would be impossible to have at this juncture in this particular technic, since with a narrower section there would not be sufficient room to manipulate the devices used for controlling these strands.

Having completed the weaving, two fine hard-twisted cotton or pita strings are prepared and with these the ends of the woven section are bound. This binding is done with two elements, one horizontal, passing on the front, and the other wrapping element passing spirally around the horizontal element in such manner as to include at each turn two pairs of warp strands. As it passes back it goes above the horizontal cord. It then takes a turn downward and toward the right in such a way as to include two pairs of warp elements and again comes out below the horizontal cord and on the front surface of the cloth, after which it goes up and over this horizontal cord and includes two other parts of warp elements as it again passes downward and behind the horizontal cord. By a repetition of this method the whole edge is securely bound from the left toward the

right. When this is completed the batten is again inserted and this binding firmly driven home against the last row of weaving.

The colored warp elements are now carefully selected and cut out close to the two ends of the weaving. Thus there are left only the white or brown cotton threads used as the body of the warp and the background for the patterns. These are cut about midway between the two ends of the weaving, thus freeing the textile from the loom.

Now and then it happens that, in the course of weaving, some of the warp or weft elements are broken, when it is necessary to tie them. The loose ends of such a tied strand naturally appear on one or the other of the surfaces of the fabric, which is now carefully inspected and such projecting ends cut off with a sharp knife.

Two small wooden rods a few inches longer than the width of the textile are next procured and the textile at each end is tied by means of the fringe of warp elements to one of the rods. There are twenty or even thirty such ties made around each of the rods. The textile is then taken to the river-bank, where four posts are driven in such manner that it may be stretched horizontally by tying the ends of the rods to the posts (pl. CXI). The fabric is then thoroughly wet and allowed to dry in the sun, which shrinks it as much as is possible, adjusting the strands one to another and tending to reduce any stiffness in the textile.

When dried the fabric is taken down and the fringe untied from the rods. A hemispherical calabash vessel or other rounded surface is next provided and with a

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sharp knife the fringe, placed against the calabash, is trimmed close to the binding at the edge. The fabric is now ready for use.

Mantas (pls. CXII–CXV), called tyū′nya by the Cayapa, used by the women as skirts, and also mochos (pl. CXVI), called wa′ra, are almost the only textiles now made. No other aboriginal garments are worn except the narrow belt (pl. CVII, 1, 2) used by the women in connection with the manta. These belts are woven in precisely the same manner as are the wider textiles, except that a loom is not used unless it is desired to make a wide and elaborate belt.

For narrow belts two short wooden pegs are driven into a section of a plantain or other succulent stem, and upon these the warp strands of the belt are set up on the two transverse bars (*c*, *d*) of a regular loom. For a narrow belt, pita string is often used as the weft. The wide belts are often nicely decorated with geometric or bird and animal figures. For weaving a narrow belt, no shuttle or batten is used ordinarily, the string being passed in the form of a ball between the warp elements, and the finger used to drive the weaving down tightly. The ends of narrow belts are not provided with a special binding; the warp strands at each end are simply braided, usually in two sections, the braids being used for the attachment of tassels made usually of red or blue woolen yarn.

Mantas, of course, are of various sizes, governed by the age of the persons for whom intended. The manta of an adult woman usually measures about thirty by sixty inches, and requires often several months for its weaving,

since such weaving is done in large measure only at odd times.

The trunks or mocho (pl. CXVI) worn by the men is made of cloth woven by the women, a special narrow fabric being produced for this purpose. One of these pieces of cloth contains enough for two mochos. It is always cut and sewed by the men themselves, some of them being adept with the needle. The women know almost nothing about sewing. It ordinarily even falls to the men to make the small mochos for the boys until they are old enough to sew for themselves.

The subject of manta designs is treated under Decorative Art.

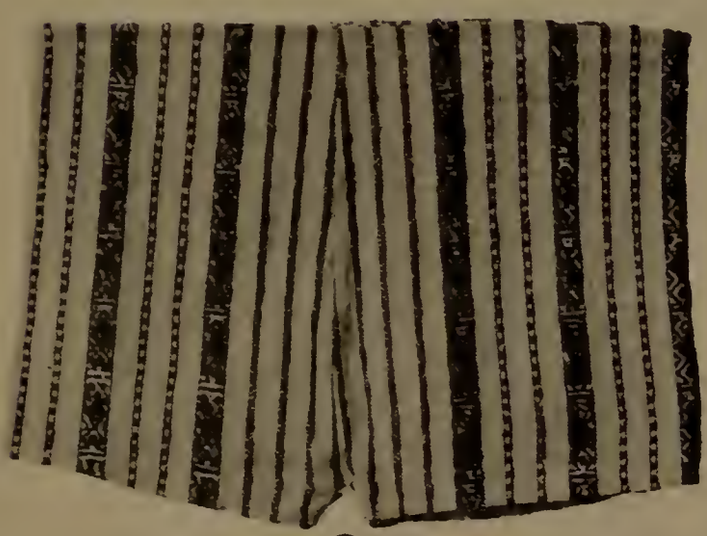
CORDAGE AND NETTING

In most cases cordage and nets are made of the fine, long, white fibers obtained from the leaf of the plant called in Spanish pita and in Cayapa sa′nō, and to a much more limited extent the fibers from the bark of a tree called in Spanish cosadera and in Cayapa señgī′lya are used.

The preparation and manipulation of pita, to which reference has been made hitherto, are quite elaborate. The long, slender, full-grown leaves of the plant are cut off close to the ground and brought to the house in bundles, such as those shown leaning against the house in pl. LXVI. While the leaf is still green the fibers are extracted by first scraping off the succulent portion of the concave side of the leaf and then stripping out the fibers from the remainder. For this scraping there are required a semi-cylindrical log of palm-wood, called sañwi cī′nō,

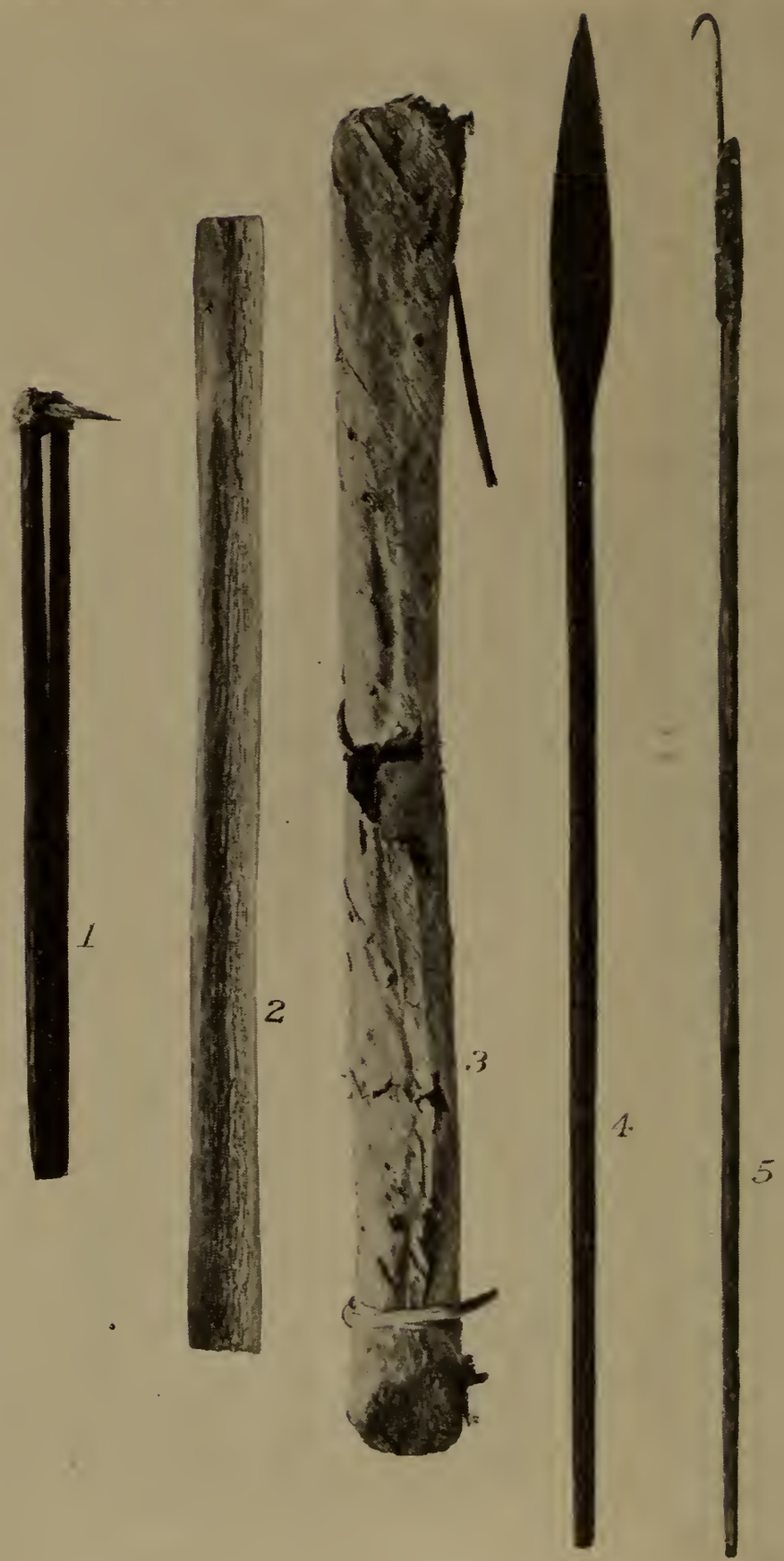
1

2



3

MOCHOS OR TRUNKS



SCRAPERS, TORCH, LANCE, AND HOOK

and a double-edged shaving knife, called sañwi'ctcîpapa. The log is half of a nine or ten foot section of a trunk of the pambil palm. Its flat side is leaned against one of the horizontal beams that compose part of the superstructure of the house, at an angle of about twenty degrees with the perpendicular and about midway between two vertical poles the tops of which are bound to the opposite or outer surface of the beam. These poles, which are usually the forked ones used to support the loom, are placed about two feet and a half apart. At a height of six or seven feet from the floor a piece of pitigua is bound to the two poles and so placed that it passes horizontally across the curved surface of the log. A second piece of pitigua is tied horizontally and at a level also about six or seven feet from the floor, but at a distance of several feet toward the interior of the house.

The pita leaves are now sorted according to length. Six or eight leaves are then piled neatly one upon another, bottom uppermost. This bunch is bent double and passed behind the pitigua cord that runs directly across the log; the cord presses the leaves at their fold tightly against the log, holding them in place during their manipulation. The leaves are always placed so that the concave side of each is uppermost and so that at first the bases of the leaves hang down against the log. The upper half of the bunch of leaves, and also those individual leaves of the lower half which are not actually in use, are kept out of the way by being passed up over the cord above mentioned, which is stretched at some distance from the log.

Beginning now with the base ends of the leaves, the

lowest one in the bunch is brought down on the convex surface of the log, and with the corner of a knife the succulent outer layer is split throughout the length of the section of the leaf exposed. This allows the leaf to be easily flattened against the log so that the succulent layer may be scraped off with one of the edges of the knife (fig. 25).

The knife used for this purpose is illustrated in pl. CXVII, 2. It is usually made from half of a section of wild cane (Spanish caña brava), and is ordinarily from fifteen to eighteen inches in length. The soft center of the cane is hollowed out so that only the hard, woody portion of the outside of the stalk remains. The two edges of this semi-cylindrical section are very sharp, thus producing a serviceable implement.

The succulent portion of the leaf having been scraped off and the fine fibers exposed to a length of eight or ten inches at the base of the leaf, the fibers are loosened with a thumb or finger nail and are then split loose as far up the leaf as the scraping has progressed by pulling them gently outward. A slit is then made in this scraped section and the loosened fibers are passed through and looped (fig. 25) in such manner as to prevent them from becoming tangled as the scraping proceeds farther up the leaf. When this half of the leaf is completely scraped, it is hung at the side of the pole and the corresponding portion of the next leaf is scraped.

Finally, all the lower halves of the leaves having been scraped, the upper halves which had been placed overhead are brought down upon the log and held in position by means of the horizontal cord which secured the lower

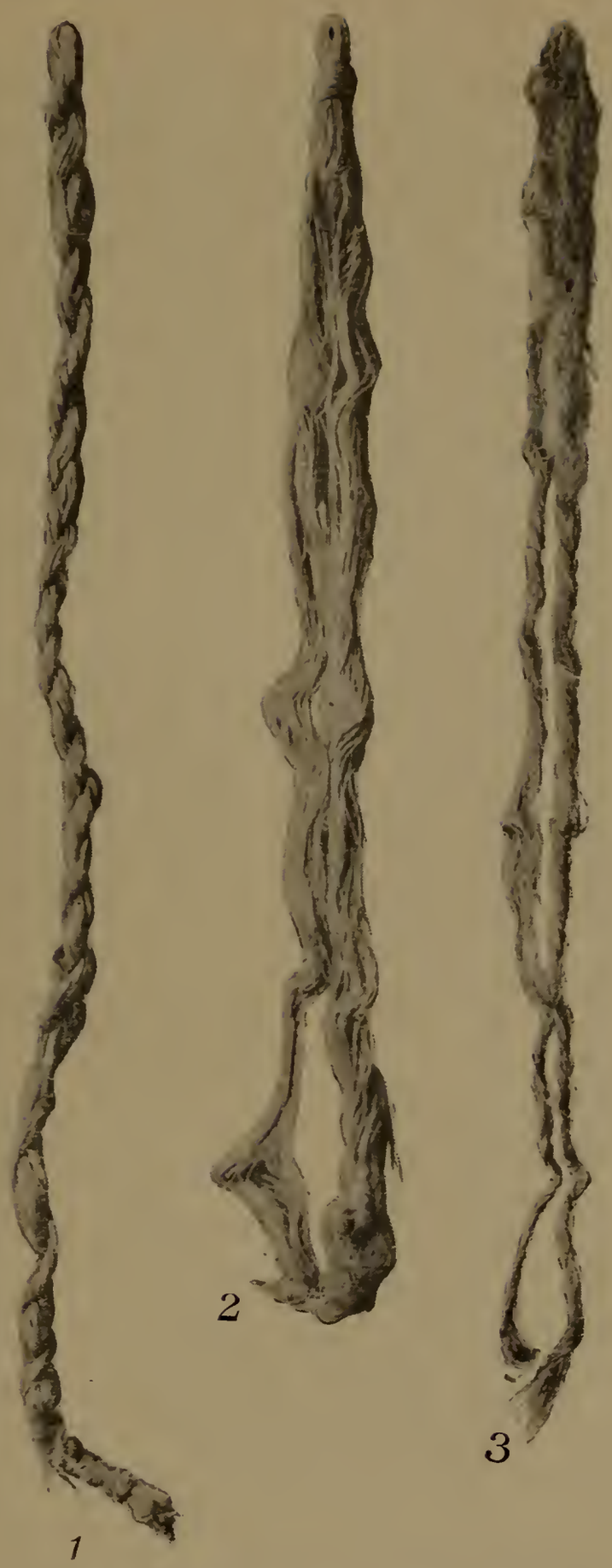
halves. This is done by bending over a section about a foot long at the extreme tip of the bunch of leaves. The

Fig. 25.—Pita fibers tied to prevent tangling

upper halves of the leaves are then scraped as described. Finally each leaf is separately reversed, the scraped por-

tion being passed back over the shoulder, and the last foot of the tip of the leaf is held in place upon the log with the left hand. With the knife held in the right hand, its surface is scraped the same as that of the remainder of the leaf. The leaves are then taken from the pole and the fibers carefully stripped off with the hands. The fibers from each leaf are coiled up separately and the coils are later taken to the river and thoroughly washed to remove what pulp and juice remain. The product is a set of light-green fibers which are placed in the sun to dry and bleach, and finally are combined into large bundles or skeins which are stored until needed. Such a set of fibers is first doubled and the halves are lightly twisted together, producing a long, slender skein such as that shown in pl. CXVIII, 1. This is again doubled and lightly twisted, and even a third doubling and twisting may be employed to make the skein of the desired length.

In preparing the fibers for making string, one end of a bundle of them is tied to an upright support, and the fibers of the loose end of the bundle are combed with the fingers to remove any short and useless ones and to bring the long ones parallel. These long fibers, still tied in the bundle, are then selected according to the kind of string desired, and are made into loose plies by first twisting them with the fingers and then by rolling them upon the calf of the right leg. This results in a bundle of plies such as that shown in pl. CXVIII, 2. When all of the bundle of fibers has been treated in this manner, the plies are selected in pairs and twisted together by grasping a pair of plies in the left hand so that the first finger passes



PITA FIBERS, PLIES, AND CORDS

TROT-LINE, BUNDLE OF PITA FIBERS, AND CORDAGE

between the two; they are then rolled simultaneously with the palm of the right hand upon the calf of the right leg in order to twist each separately. They naturally twist together beyond the left hand by virtue of the tortion in the separate plies, but at frequent intervals are pulled apart, since each must be thoroughly twisted separately before the two are allowed to twist themselves together to form the string. At last the finger which has been used to separate the plies is withdrawn and the rolling motion is reversed, so that the hand is drawn toward the body instead of moving from it. This reverse motion, combined with the individual tortion in each ply separately, serves to twist the two plies together in the opposite direction to that of the individual twist of each ply and to form a firm and strong string. The twisting of such a lot of plies results in a bundle, or what may be termed a skein, of cords such as that shown in pl. CXVIII, 3. All string is two-ply, its size being governed by the quantity of fiber used for each ply and by the use for which it is intended.

A large number of fibers are obtained from each leaf, and a considerable number of strings, each as long as the leaf, result from the twisting process. In one case, for example, four leaves yielded sixty-four fine cords such as are used for weaving the conical casting net. The length of each of these cords was about fifteen feet.

In twisting cords in the manner described, care is taken that they do not become tangled. Accordingly when a considerable number of cords have been twisted they are divided into three approximately equal groups which are then braided. As the work progresses and

several other cords are completed, these are added to the braids at the ends. Thus by adding group after group of these braids, when the whole bundle of cords is completed and both its ends are braided it forms a skein of cords which appears like that shown in pl. CXVIII, 3. The skein is kept in this form and the individual cords are extracted from its middle. This tends to pull backward and to loosen the braids at the two ends of the bundle and thus easily to free the ends of the individual cord from the braids.

The other kind of string obtained from the bark of the tree called in Spanish cosadera and in Cayapa señgī'lya, is made in a manner similar to that employed in making pita string. The fibers used in making this string are obtained by beating out the bark by the method employed in making bark cloth. After being washed, as in the case of bark cloth also, these fibers are dried, folded, and bound into bundles (pl. CXIX, 2). When needed, the sheets are taken from the bundle and the fibers are separated and twisted into a heavy and rather loose cord which serves very well for making a hammock or as the main cable of a trot-line (pl. CXIX, 1), but otherwise is little used. The string bears the same Cayapa name as the tree itself, and its primary use is for hammocks, which are woven with the same technic as are fish-nets, shortly to be described. The meshes are, however, extremely large and are made without the aid of a mesh-stick, being kept sufficiently even by the eye alone.

The Cayapa do not splice cords by twisting together the fibers at their ends, as is done by some Indians. An individual pita cord is usually from ten to sixteen feet

in length and is used as a distinct unit in the weaving. When the weaving has proceeded to within six or eight inches of the end of the cord, a second is simply tied to it in a square knot and thus is added a new unit of material. Hence no shuttle is required as among peoples who use a very long thread or cord. In fact the only implement required in weaving is the mesh-stick, which is usually of bamboo, although large ones are sometimes made of wood. It is ordinarily from five to seven inches in length and varies in width according to the size of mesh desired (fig. 26). The relatively wide ones used in weaving the large-meshed set-net are called wa′lō tcīpapa, thus differentiating this form from that known as a*ta*′ia tcīpapa, or ate′ tcīyapa, used in weaving the casting net. The general term for mesh-stick is ya′ tcīpapa.

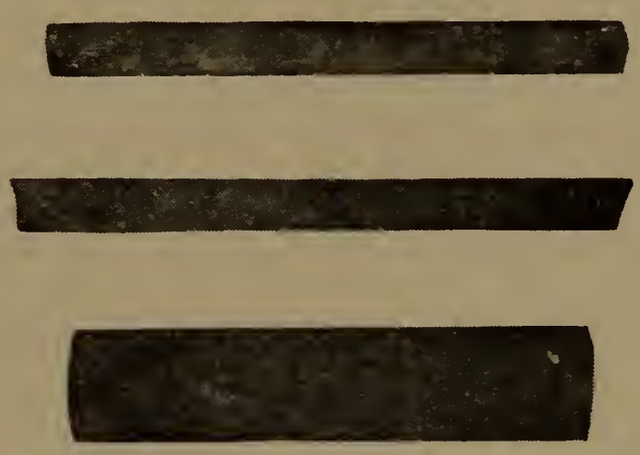


Fig. 26.—Mesh-sticks or gauges for weaving nets

In weaving one of the large set-nets, such as that shown in pl. cxx, 2, and called by the Cayapa wa′kū, the required number of knots, usually five, is first tied to start the corner of one end. By adding a knot at each end, new meshes are added; and as each row of meshes is woven, the width of the net may be increased to any desired degree. This first portion of the net forms a right triangle, one side of which represents the width of the net, the other an equal length along one side of the net. The hypotenuse of the triangle is the line along

which the weaving is done. By weaving now evenly along this line without adding more meshes to the succeeding lines, a rectangular net of the desired length is produced. The final corner of the net is made by dropping knots and meshes in the succeeding rows of weaving: in other words, by exactly reversing the process employed in starting the original corner.

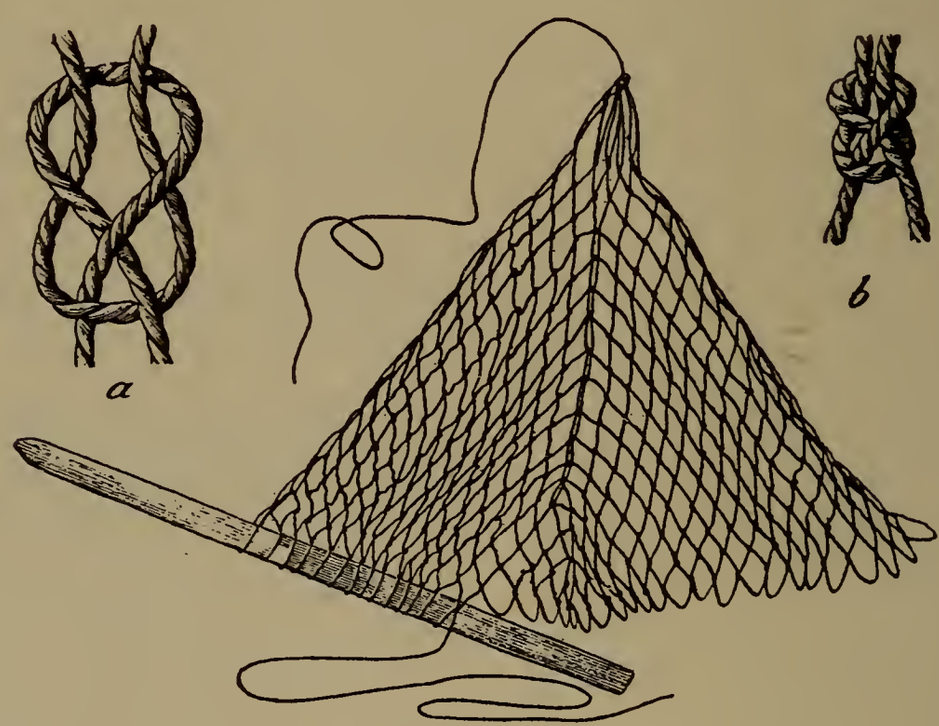


Fig. 27.—Net weaving and detail of knot

All nets are woven with the same type of knot, two details of which are exhibited in fig. 27. In *a* is shown one of these knots opened to a considerable extent, and in *b* this knot is shown as it appears closed and drawn tightly in the net. The use of the mesh-stick is also shown in the figure, which illustrates the beginning of a conical dip-net. The technic of this net differs somewhat from that of the set-net above described, but the knot employed and the use of the mesh-stick are the same.

Starting with a series of five knots and meshes at the point, this net is widened, as in the case of that above described, by adding an extra mesh at each end of each course. In addition, an extra mesh is added at the middle of each course, thus producing a double line down the middle of the net, as shown in fig. 27. To complete the net it is necessary only to join the open edges. This produces a conical net about two feet deep from the point to the opening, which is itself about thirty-six by eighteen inches.

The principle of the conical casting net, shown in pl. cxx, 1, is presumably adopted from the negroes, being made in exactly the same way as the nets manufactured by them. Furthermore, it bears the name a*ta*'ia, clearly derived from the local Spanish term atarraya.

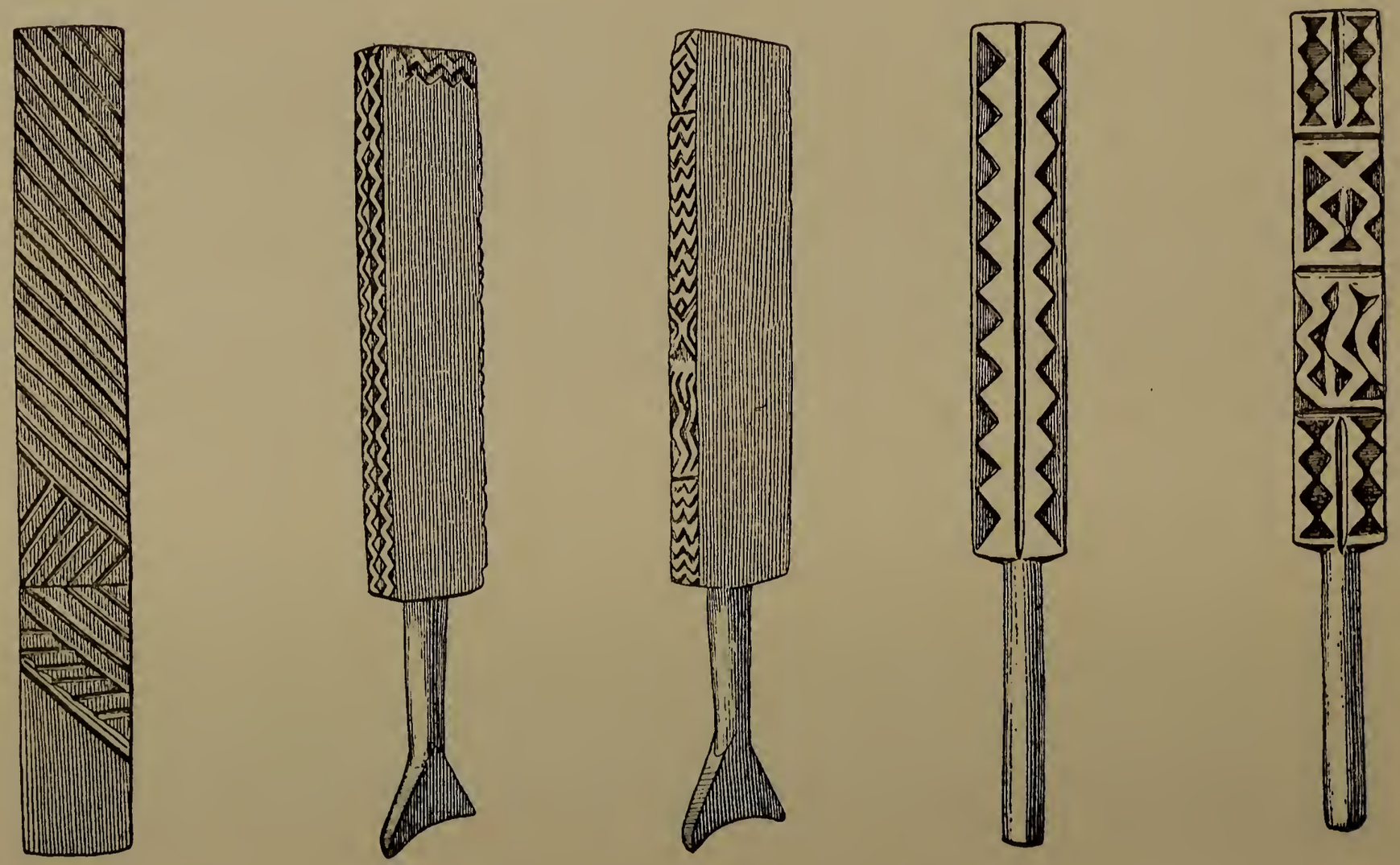
In general technic this net is similar to the set-net above described, although its point is started quite differently. First a considerable number of fine pita cords (in one instance forty were counted) are braided tightly together to form a strong loop about two inches long, into which is fastened the line by which the net is drawn in after a cast is made from the canoe. The loop must be very strong, and in order to add to its strength it is tightly wound for a space of three-quarters of an inch along its lower part. Out of this binding emerge therefore, in the above-mentioned instance, the forty pairs of strands which are immediately tied to form the first course of forty knots and meshes. The second course has the same number, but thenceforth the number increases. Into every alternate mesh of this second course is looped another cord, thus producing in the third course

sixty meshes. This number is kept up to the seventh course, where twenty more cords, distributed at regular intervals, are looped in. Hence in the eighth course eighty knots appear. Thus the additions proceed at these regular intervals, twenty new elements being added at every fifth course up to the sixty-second course of knots. Since this process begins at the second course, these additions are made to come on those courses whose numbers end in two and seven—two, seven, twelve, seventeen, etc. Hence, when the sixty-third course is tied there is a total of three hundred knots and meshes, and this number is maintained throughout the remainder of the one hundred and twenty-seven courses of the net. The meshes of this particular net are two centimeters square throughout its length of eight feet, seven inches. As it is cast by a fisherman it easily covers a circle ten or twelve feet in diameter.

These nets are usually made of fine pita cord in the upper part of the cone and of slightly coarser cord in the last quarter or third near its mouth. The heavier cord is apparently used in this portion of the net because of the greater wear and tear due to the struggles of the entrapped fish and because the net is weighted about its mouth with sinkers. These lead or stone sinkers often aggregate twenty-five to thirty pounds in weight and carry the net quickly to the bottom.

The only other netted device made by the Cayapa is the hammock, which is made either of coarse pita string or of the heavy kuna-kuna string. The meshes of such a hammock are very coarse, hence comparatively few cords are required. To start with, the proper number

FISHING NETS



CARVED FACE-PAINTING STICKS

of cords is selected and of them is made a large loop, the lower inch or so of which is securely wrapped as in the case of the loop of the casting net, and it is from this wrapping that the cords emerge. In one instance, that of a hammock made of pita cord, there are fourteen of these cords coming out of this wrapping. To these are added the end of the cord with which the wrapping is done. With these fifteen cords the body of the hammock is woven. Each alternate course of knots numbers seven, while the next course contains eight. The meshes of such hammocks are not made over a mesh-stick, and hence vary somewhat in the same hammock. In the example above mentioned they range from four and one-half to six inches square. In this instance seventeen courses of knots were required to complete the hammock, which, when closed and stretched, measures eight feet in extreme length. The second end is finished off with the same kind of a loop as that above described. The description of this hammock will serve for all, there being little variation.

DECORATIVE ART

From considerations of technic the decorative art of the Cayapa falls into four classes: textile decoration, incised decoration, painting, and carving. In the first class belong such designs as appear on twilled baskets, fans, mats, and soft textiles; the second class is confined entirely to the surfaces of calabash utensils and to a slight extent to pottery; the third is found on canoes and on the human body; and the fourth class is confined to wooden dolls, paddle handles, and sometimes seats.

In the matter of the forms also, the designs fall practically into these general groups, though in certain instances the same design is found in more than one group. Taken as a whole Cayapa designs are largely geometric, the only exceptions being in the carved wooden dolls, in a few calabash designs, and in a considerable number of the designs on soft textiles. Now and then a realistic modern design is found also upon a canoe and in rare instances in a painting upon the human body. This entire statement applies to the frequency of occurrence of the different types of design. If considered, however, from the standpoint of the number of various elemental designs of the realistic class as compared with elemental designs of the strictly geometric class, the former are fully equal to the latter, though the geometric designs are subject to greater variation.

It is remarkable that few names are given designs except in the case of those on soft textiles. In the case of the face, arm, and leg paintings, for instance, no names were obtainable, and they have no symbolic significance. This fact is noteworthy when so large a series of designs is found (pl. XXXIX–LII) and when they are so universally and extensively used. The only exception to this rule is that of the trident-shape design shown in pl. LII, 11. This, however, is strictly modern and was copied directly from the fish-spear.

Also in the considerable series of canoe designs shown in pl. LXXII–LXXV, no specific names were given by informants. These are all old-type designs and much preferred by the Cayapa to the modern designs which some paint on canoes made for sale, but never upon those

designed for their own use. In every instance these old-type designs are geometric, but the newer ones are usually realistic, depicting mammals, human beings, and other realistic objects.

In carving, the dolls are entirely realistic, as is shown in pl. LXXXIV, and depicting, the dog, alligator, bird, and especially the human form. In the last instance care is usually taken to indicate the sex. In paddle handles, on the other hand, the forms are usually simple and are always geometric, as is shown in pl. LXXVI. They have no special names. Even in the case of the elaborately carved handle shown in fig. 9 of the plate, no name was given for any of the designs. The same holds true of the designs in the face-painting sticks depicted in pl. CXXI–CXXII.

Closely related to ornamental carving are the wooden seats shown in pl. LXXXIII, some of which receive ornamental treatment certainly not demanded by utilitarian considerations. From comparison with similar objects of South and Central America it seems probable that in these seats, especially the forms shown in figs. 2 and 3, there lies a striking connection of the Cayapa culture with that of a number of other tribes in these regions. As has been shown by Professor Saville,[15] the archeological range of these objects is extensive, the most elaborate among them being the large stone seats from Manabi, carved to represent jaguars.

On the surfaces of calabash utensils are found the only incised designs in use among the Cayapa. These are

[15] See page 156, note.

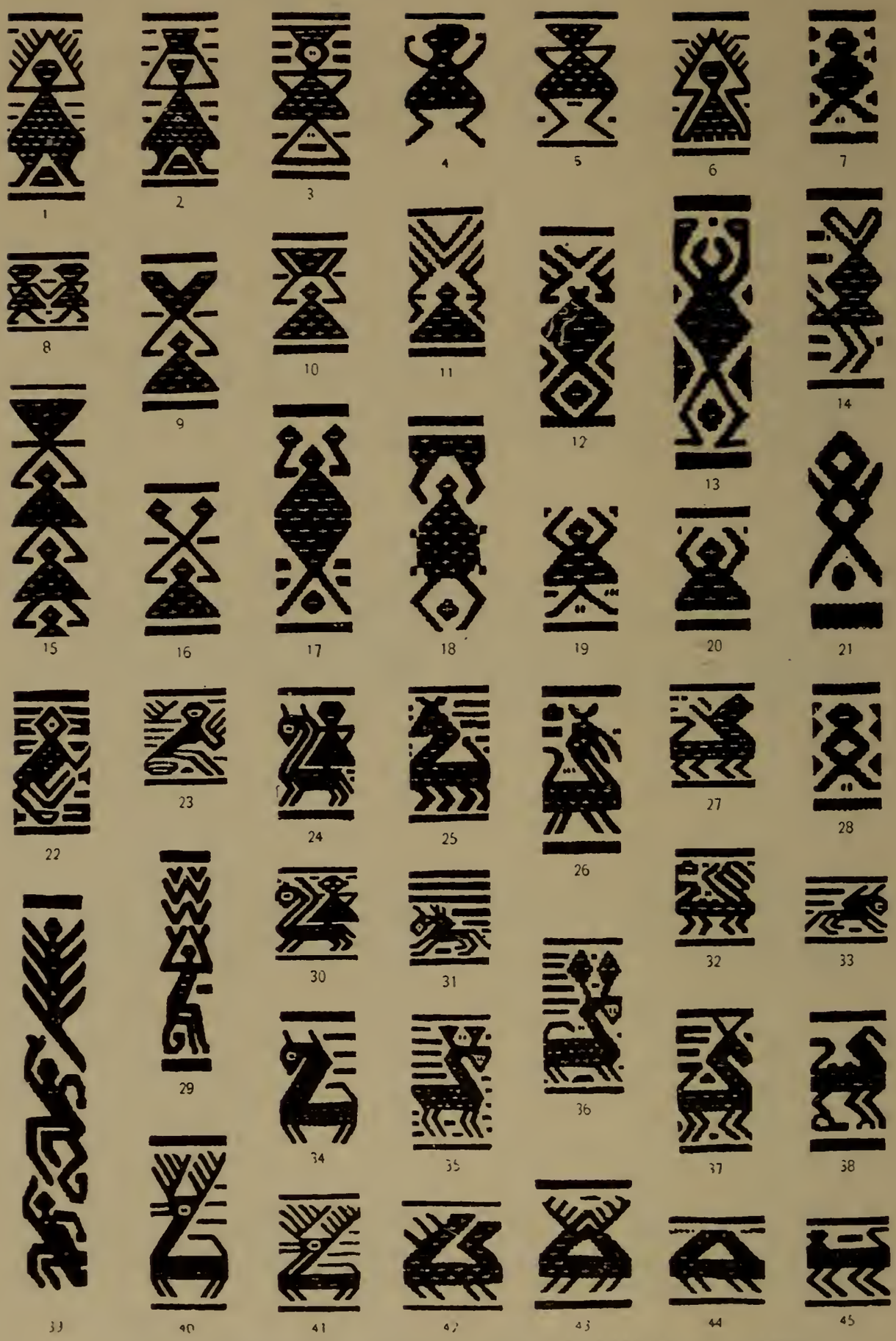
made by cutting with the point of a knife or machete through the calabash rind, exposing the inner, white, hard portion which at first contrasts greatly with the brown general surface of the utensil. After such a utensil has been used for a time the incised designs also become brown. The calabash designs shown in pl. LXXXVI present various realistic figures, as well as a considerable number of geometric designs. In the small series of figures shown in this plate there are ten recognizable animal forms, namely:

Subject	*Figures*
Human being	1–4
Human being on horse	5, 9
Monkey	6
Horse or dog	18
Bird	10–12
Lizard	13
Turtle	16
Crab	14, 36
Scorpion	7
Tick	15
Animal (unknown form)	8, 17

The majority of these designs are relatively small, but in the crab design shown in fig. 36 of pl. LXXXVI, is presented a notable exception. This design appeared about the opening of a large, spherical, water-storage calabash and covered about half the entire surface of the vessel. The usual names given to the various animals themselves are also applied to these designs. As usual, on the other hand, the geometric figures are frequently unnamed.

Cayapa pottery is very simple in its forms and is entirely without decoration except in rare instances in

CARVED FACE-PAINTING STICKS



CLOTH DESIGNS: HUMAN AND MAMMAL FIGURES

which a slight attempt is made to ornament the edge of the shoulder of a vessel with a few incised lines or dots. No names are given to these simple decorations, and no attempt is made to work out any regular patterns even in the rare instances in which they are used.

The designs in hard textiles—twilled baskets, mats, and fans—are purely geometric, fairly simple (as is shown in pl. CV), and few in number. These conditions are quite natural and are imposed by the character of the material and the technic employed. There is comparatively little naming of these designs. Zigzags such as those shown in figs. 3 and 5 of the plate are called dē′tcū, and figures such as are illustrated in figs. 25 and 27 are commonly called kapū′ka, signifying "eye."

Soft Textile Designs

It is in the soft textiles that the greatest variety of both geometric and realistic designs appears and where the only detailed naming of designs occurs. A table of the names of the various manta designs shown in pl. CXXIII-CXXVII, together with a glossary, is given in the following pages. From these data various interesting facts concerning the names of manta designs are apparent.

The names may be classified as: mammals, birds, reptiles, insects, miscellaneous animate objects, parts of animate objects, plants, artificial objects, geometric figures, and untranslatable terms. The following tabulation will show the various numbers in each class.

Mammals:
- human being
- monkey (two species)
- horse
- burro
- cow
- dog
- goat
- sheep
- guinea pig
- deer

Birds:
- pī'tcū
- la'pītcū
- tū'mbītcīlīlī
- hawk
- pelican
- turkey
- buzzard
- frigate bird
- duck
- egret
- dove (general term)
  - pactū'kū
  - wa'pū'pū
- chicken

Reptiles:
- snake (general term)
- boa constrictor
- lizard

Insects:
- centipede
- scorpion
- tick
- spider

Miscellaneous animate objects:
- crab
  - nē'lū
  - *te*'pūī nē'lū
  - There are also three compound terms in which the word crab appears.
- turtle
- toad

Parts of animate objects:
- eye (general term)
  - little eye
  - kapū'ka ya dētcū
  - ka'pū tcīlara
  - kapūka dalala ke''tū
  - dū'lalara kapūka
- ear
- lizard foot
- lizard egg
- tongue of sting-ray

Plants:
- pitigua
- fruit

Artificial objects:
- feast table
- belt or girdle
- ladder
- steps of ladder
- stick used for face painting
- top
- bait
- steel, of "flint-and-steel"
- canoe design
- cross
- handkerchief design
  - also te'mbū balya'lya

Geometric figures:
- zigzag
  - se'rañ dētcū
  - ē' dētcū
  - ūyū'mī dētcū
  - de''pañmī dētcū
  - dē'tcū serañ tsū'a
- horizontal

Miscellaneous:
- technic (the bandilas technic is mentioned).
- color

Untranslatable terms:
balya'lya
balya'lyac
delam ba''ta
de'we
dū'lalara
hō'lara
hū''la
hū'lara
hū'rula
hū'rūlara
kūē'bū
nim bī'lya
pala'cla
pala'la
pala'c lara
pala'lac
pala'lara
pala'ra
palû'c lara
pala'tcū
petī
pū'ka ka
se'rañ
tapū'lyū
tē'pū balya'lya
tyūlya'lya
tyūm bī'lya
wīlû'cla
tyū'ndyū tcī lara

While there is a large series of geometric figures, as shown in pls. CXXV–CXXVII, and while these appear on mantas in fully as great as, if not in greater numbers than do the realistic figures, inspection shows that these are really variations of a comparatively few geometric elements, chiefly the zigzag, the cross, the triangle, and the rectangle, and that in reality there are not such a large number of distinctive designs as might at first appear. Furthermore, an inspection of the native names of these designs, most of which are of the untranslatable class, shows that the Cayapa recognize these similarities and that little realism is read into the designs by them. In fact the designs called eye, steps of a ladder, crab design (by which is meant the tracks made by a crab in the mud), and steel for striking fire, are the only ones of known significance that show evidence of a tendency toward realism in geometric forms. There may be among the untranslatable terms some which would, if their significations were known, show a similar tendency.

Conventionalization of realistic designs, on the other hand, is somewhat more common, though this conventionalization is such as might be expected to be imposed by the nature of the textile and by the technic employed. Among the best examples of this are such human beings as those shown in pl. CXXIII, 12–16, or such toads as those illustrated in 17 and 18 of the same plate.

Another good example of this tendency is shown in fig. 42, called pelican, and in fig. 45 which is called dog and also monkey. In general this tendency toward the conventionalization of realistic designs appears to be present chiefly among the more unskilled weavers, and it will be observed that as a rule the more finely woven and better textiles from a technical point of view show correspondingly greater skill in design and a greater tendency toward realism. In such textiles the designs are usually of such a nature that there can be no doubt as to their import.

Perhaps one of the most striking features of the textile patterns of the Cayapa is what may be termed an abhorrence of vacant spaces. It will be observed that in a design to which any claim to elaborateness can be made, the tendency is to fill all corners and small areas, not directly connected with the main motif of the pattern, with lines, dots, or other small figures.

In conclusion, therefore, it may be said that the decorative art of the Cayapa is characterized by the following features:

1. A predominance of geometric patterns which in a large measure bear no names and have no definite signification.

2. The presence upon textiles, and to a lesser extent upon calabash utensils, of realistic designs, which in certain instances tend toward conventionalization.

3. A slight tendency toward the assignment of realistic significations to what appear to be purely geometric forms.

4. The abhorrence of vacant spaces, shown by the filling of all small areas about a large design with dots, lines, and other irrelevant devices.

Table of Manta Design Names

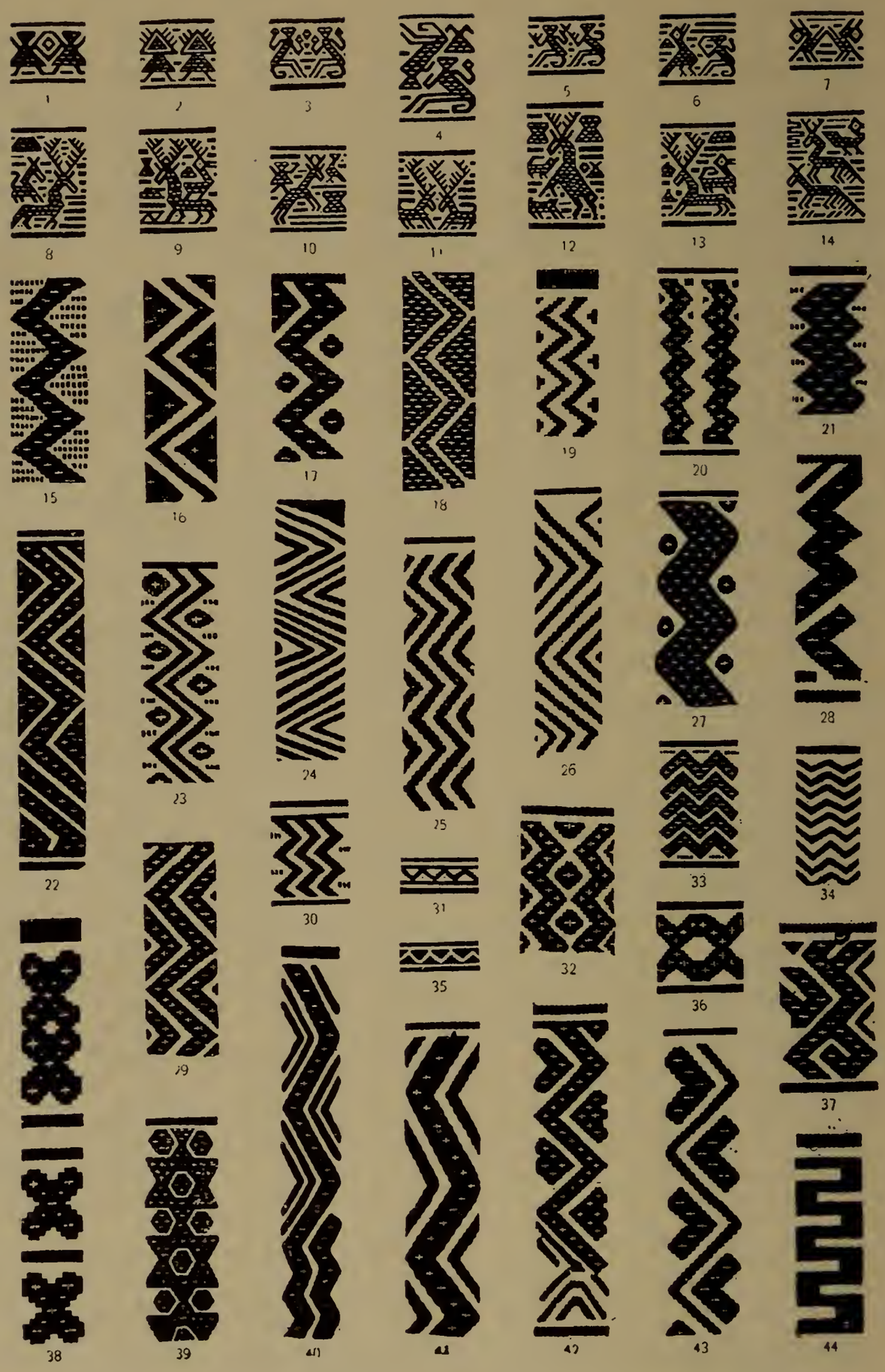
Plate	Figure	
CXXIII	1	human being (tca′tcī)
	2	human being (tca′tcī)
	3	human being (tca′tcī)
	4	human being (tca′tcī)
		toad (sa′pū, Spanish sapo)
	5	human being (tca′tcī)
	6	human being (tca′tcī)
	7	human being (tca′tcī)
	8	human being (tca′tcī)
	9	pala′la (untranslatable)
	10	pala′la (untranslatable)
	11	balya′lyac (untranslatable)
	12	spider (mū′*t*ele, Spanish araña)
		human being (tca′tcī)
	13	human being (tca′tcī)
	14	human being (tca′tcī)
	15	human being (tca′tcī)
	16	human being (tca′tcī)
	17	toad (sa′pū, Spanish sapo)
		hū′rūlara or hū′′la (untranslatable)
	18	toad (sa′pū, Spanish sapo)
	19	human being (tca′tcī)
		toad (sa′pū, Spanish sapo)
	20	toad (sa′pū, Spanish sapo)
	21	hū′′la or pala′tcu (untranslatable)

Plate	Figure	
CXXIII	22	monkey (cū′rī, Spanish machin, mico; and wo′cū, Spanish mono)
	23	monkey (cū′rī, Spanish machin, mico)
	24	horse (k wa′lyū, Spanish caballo), with human being (tca′tcī)
	25	horse (kawa′lyū, Spanish caballo)
	26	horse (kawa′lyū, Spanish caballo)
		goat (tcī′bū, Spanish chivo)
	27	horse (kawa′lyū, Spanish caballo)
		goat (tcī′bū, Spanish chivo)
	28	ho′lara (untranslatable)
		human being (tca′tcī)
	29	monkey (cū′rī, Spanish machin, mico)
	30	horse (kawa′lyū, Spanish caballo), with human being (tca′tcī)
	31	monkey (cu′rī, Spanish machin, mico)
		horse (kawa′lyū, Spanish caballo)
	32	No interpretation obtained
	33	horse (kawa′lyū, Spanish caballo)
	34	horse (kawa′lyū, Spanish caballo)
	35	cow (waga′ra, Spanish vaca)
	36	horse (kawa′lyū, Spanish caballo)
	37	horse (kawa′lyū, Spanish caballo)
	38	pelican (nana″ ka, Spanish alcatraz)
		crab (ne′lū, the small red land-crab)
		monkey (wa′cū, Spanish mono)
	39	monkey (cū′rī, Spanish machin, mico)
	40	deer (ma′na)
	41	deer (ma′na)
		hawk (hūya′lyū, Spanish gabilan)
	42	pelican (nana″ ka, Spanish alcatraz)
	43	human being (tca′tcī)
	44	No interpretation obtained
	45	dog (kū′tca)
		monkey (wo′cū, wa′cū, Spanish mono)
CXXIV	1	guinea pig (a″tse)
		sheep (ōīc′a, Spanish oveja)
	2	guinea pig (a″tse)
	3	guinea pig (a″tse)
	4	sheep (ōīca, Spanish oveja)
		guinea pig (a″tse)

Plate	Figure	
CXXIV	5	human being (tca'tcī), with guinea pig (a''tse), or sheep (ōī'ca, Spanish oveja)
	6	human being (tca'tcī), with sheep (ōī'ca, Spanish oveja), or guinea pig (a''tse)
	7	horse (kawa'lyū, Spanish caballo) dog (kū'tca)
	8	guinea pig (a''tse) sheep (ōī'ca, Spanish oveja)
	9	goat (tcī'bū, Spanish chivo)
	10	guinea pig (a''tse) cow (waga'ra, Spanish vaca)
	11	guinea pig (a''tse) burro (bū'rū)
	12	An animal form for which no name was obtained
	13	An animal design; no information available. It resembles a lizard and might be given by the Cayapa the name of any one of several species of lizards.
	14	horse (kawa'lyū, Spanish caballo)
	15	cow (waga'ra, Spanish vaca)
	16	monkey (cū'rī, Spanish machin, mico) sheep (ōī'ca, Spanish oveja)
	17	human being (tca'tcī) tyu'ndyū tcī lara (untranslatable)
	18	An animal form; no name obtained
	19	dog (kū'tca)
	20	bird (pī'tcū; particular species not stated
	21	pelican (nana''ka) horse (kawa'lyū). These names apply to the large bird which is the chief figure in this design. The small triangular portion of this design is called tembū balya'lya or tembū pī'lya (tembū, a contraction of tembū'pū, signifying handkerchief)
	22	domestic turkey (kastē'lya walya'pa, literally Spanish or Castilian chicken) kūē'bū (untranslatable)
	23	bird (pī'tcū)
	24	bird (pī'tcū) dove (a small species of a reddish color, called by the Cayapa wa'pū'pū)

Plate	Figure	
CXXIV	25	pelican (nana''ka)
		dove (a large reddish species, called in Cayapa pactū'kū)
	26	pelican (nana''ka)
		chicken (walya'pa)
	27	No name was obtained. It resembles the design shown in figure 33, which was called pelican (nana''ka)
	28	horse (kawa'lyū, Spanish caballo). This interpretation appears to be in error. The design is clearly a bird form, not that of a horse. It resembles in all essential details the design shown in figure 33, which was called pelican (nana''ka)
	29	white egret (ka''tsū, Spanish garsa)
		bird (pī'tcū)
		pelican (nana''ka)
		dove; exact species not stated
	30	pelican (nana''ka)
	31	bird (pī'tcū)
		dove; exact species not stated
	32	No name was obtained for this design, but in many respects it resembles that shown in figure 45, which was called white egret (ka''tsū, Spanish garsa)
	33	pelican (nana''ka)
	34	frigate bird (nyambīwa'tū)
	35	pelican (nana''ka)
	36	buzzard (kū'ndūrūrū, petyū'tyū, Spanish gallinaso)
		pelican (nana''ka)
		horse (kawa'lyū, Spanish caballo)
		goat (tcī'bū, Spanish chivo)
	37	pelican (nana''ka)
		chicken (walya'pa)
	38	pelican (nana''ka)
		duck (pa'tō, Spanish pato)
	39	tu'mbītcīlīlī (a small black bird with red beak)
	40	pelican (nana''ka)

CLOTH DESIGNS: MAMMAL, BIRD, AND INSECT FIGURES



CLOTH DESIGNS: MAMMAL GROUPS AND GEOMETRIC FIGURES

Plate	Figure	
CXXIV	41	pelican (nana''ka)
	42	dove (a small reddish species, called by the Cayapa wa'pū'pū)
	43	No name was obtained for these two birds. They would be called birds (pī'tcū), at least, and would probably be given specific names
	44	bird, a small species, black and yellow in color, a good singer and is much kept by the Cayapa as a pet (la'pī'tcū, Spanish pichichu)
		buzzard (petyū'tyū, kū'ndūrūrū, Spanish gallinaso)
	45	white egret (ka''tsū, Spanish garsa)
	46	spider (mū'*t*ele, Spanish araña)
	47	spider (mū'*t*ele, Spanish araña)
	48	spider (mū'*t*ele, Spanish araña)
	49	scorpion (alaga'ra, Spanish alacrán)
		spider (mū'*t*ele, Spanish araña)
	50	scorpion (alaga'ra, Spanish alacrán)
	51	No name obtained for this butterfly-like design
	52	No name obtained for this bird-like design
	53	turtle (pītcī'lī)
	54	turtle (pītcī'lī)
	55	crab—the small red land-crab (nē'lū)
		crab—a certain coast species (*t*epūī ne'lū)
		karna'da (probably from the Spanish). The term is said to signify bait and also to be the name of a certain species of crustacean called in Spanish camaron brava
	56	crab—the small red land-crab (ne'lū)
	57	centipede (se'pīnde)
	58	bīmbū'ka (piande, a species of lizard)
		crab—the small red land-crab (ne'lū)
	59	turtle (pī'tcī'lī)
		toad (sa'pū, Spanish sapo)
CXXV	1	human being (tca'tcī)
	2	human being (tca'tcī)
	3	monkey (cū'rī, Spanish machin, mico)
	4	monkey (cū'rī, Spanish machin, mico)

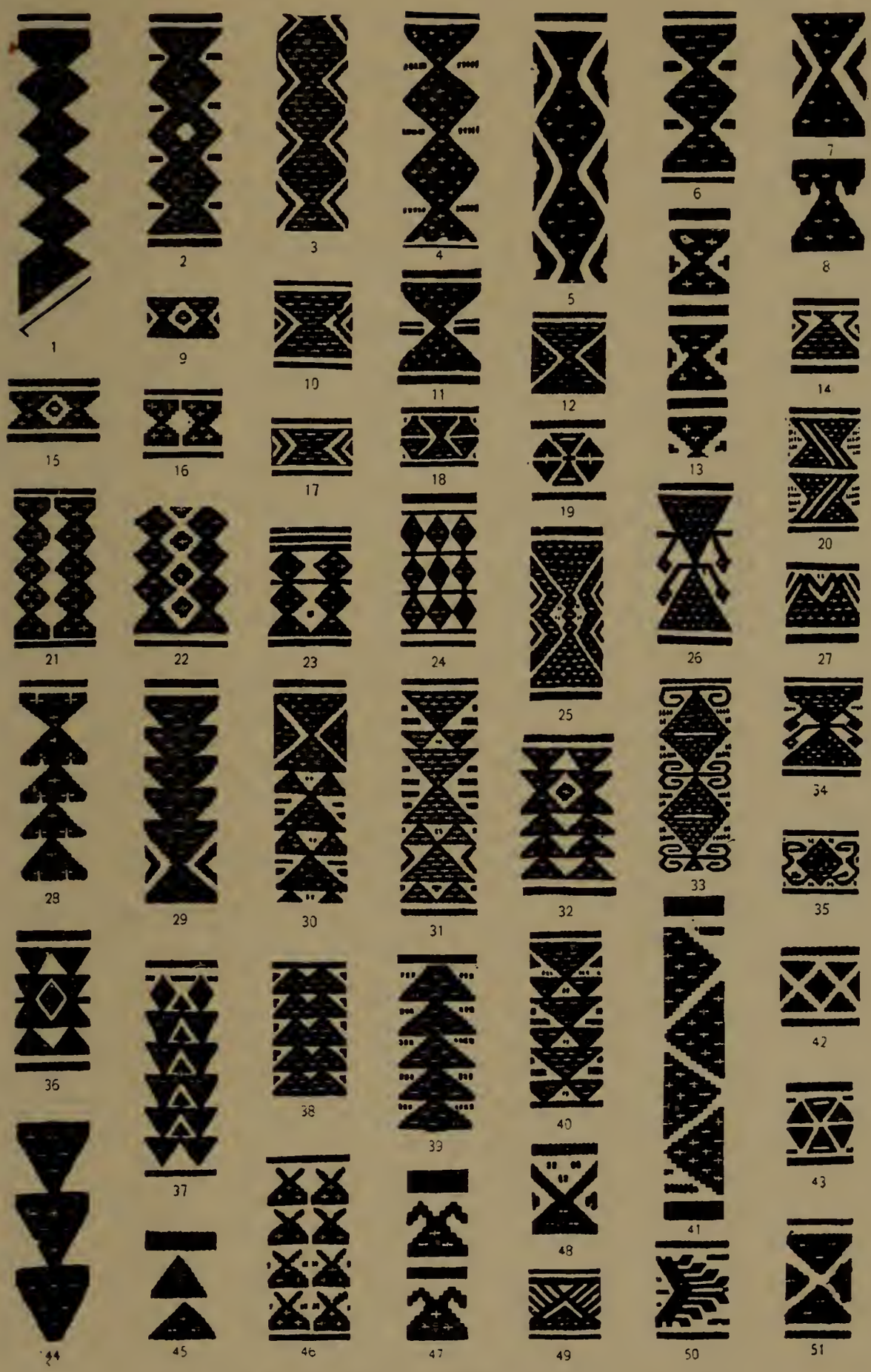
Plate	Figure	
CXXV	5	monkey (cū′rī, Spanish machin, mico)
	6	bird (pī′tcū) with monkey (cū′rī)
	7	No interpretation was obtained for these figures. They resemble some others which were called horses and are probably intended to represent that animal
	8	horse (kawa′lyū, Spanish caballo), with deer (ma′na)
	9	deer (ma′na)
	10	man (tca′tcī), with deer (ma′na), and bird (pī′tcū)
	11	deer (ma′na)
	12	deer (ma′na) with dogs (kū′tca)
	13	deer (ma′na) with bird (pī′tcū)
	14	horses (kawa′lyū, Spanish caballo), with bird (pī′tcū)
	15	zigzag (dē′tcū). The exact names of zigzags are governed by their relative size and their relations to those with which they are associated; viz.: de′′pañmī dē′tcū = horizontal zigzag ūyūmī dē′tcū = vertical zigzag e′ dē′tcū = big zigzag se′rañ dē′tcū, untranslatable form of zigzag lya′tena (the palm-wood steps of the house ladder). This name refers to the short lines which fill the spaces at the angles formed by the zigzag
	16	zigzag (dē′tcū). See fig. 15 above.
	17	zigzag (dē′tcū). See fig. 15 above. eye (kapū′ka). This term applies to the diamond-shape figures in the angles formed by the zigzag.
	18	big zigzag (e′ dētcū)
	19	zigzag (dē′tcū). See fig. 15 above
	20	zigzag (dē′tcū). See fig. 15 above pitigua design (tyūm bī′lya) feast table (pa′kīgī)
	21	pitigua design (etcūm bīû, from tc′tcūm bīlya) snake (pīnī)

Plate	Figure	
CXXV	22	serañ dē′tcū (an untranslatable form of zigzag)
	23	zigzag (dē′tcū). See fig. 15 above eye (kapū′ka) and little eye (ka′ kapūka) refer to the diamond-shape figures in the angles formed by the zigzag
	24, 25, 26	zigzag (dē′tcū). See fig. 15 above.
	27	big zigzag (e′ dētcū) eye (kapū′ka and small eye (ka kapū′ka) refer to the diamond-shape figures in the angles of the zigzag
	28 29, 30	zigzag (dē′tcū). See fig. 15 above
	31	zigzag (dē′tcū). See fig. 15 above pīlya dē′we (pī′lya signifies design, and it appears that dē′we may possibly be related to dē′tcū, meaning zigzag. This design consists in part of a zigzag)
	32	big zigzag (e′ dētcū) hū′rūlara, hū′′la (untranslatable) eye (kapū′ka). This term applies to the diamond-shape portions of the design
	33	zigzag (dē′tcū). See fig. 15 above
	34	zigzag (dē′tcū). See fig. 15 above tongue of sting-ray (tyū′wī nī′ka)
	35	zigzag (dē′tcū). See fig. 15 above hū′rūlara, hu′′la (untranslatable)
	36	bīmbū′ka (piande, a small species of lizard) e pala′tcū (e signifies big; pala′tcū is untranslatable)
	37	zigzag (dē′tcū). See fig. 15 above
	38	pala′ra (untranslatable) pala′tcū (untranslatable) hū′rūlara, hū′′la (untranslatable)
	39	No interpretation was given for this design, since it appears to be of modern origin. Such a modern design is usually called te′mbū pīlya, which signifies handkerchief design from the fact that they are derived largely from handkerchiefs of modern manufacture
	40	big zigzag (e′ dētcū)
	41, 42, 43	zigzag (dē′tcū). See fig. 15 above

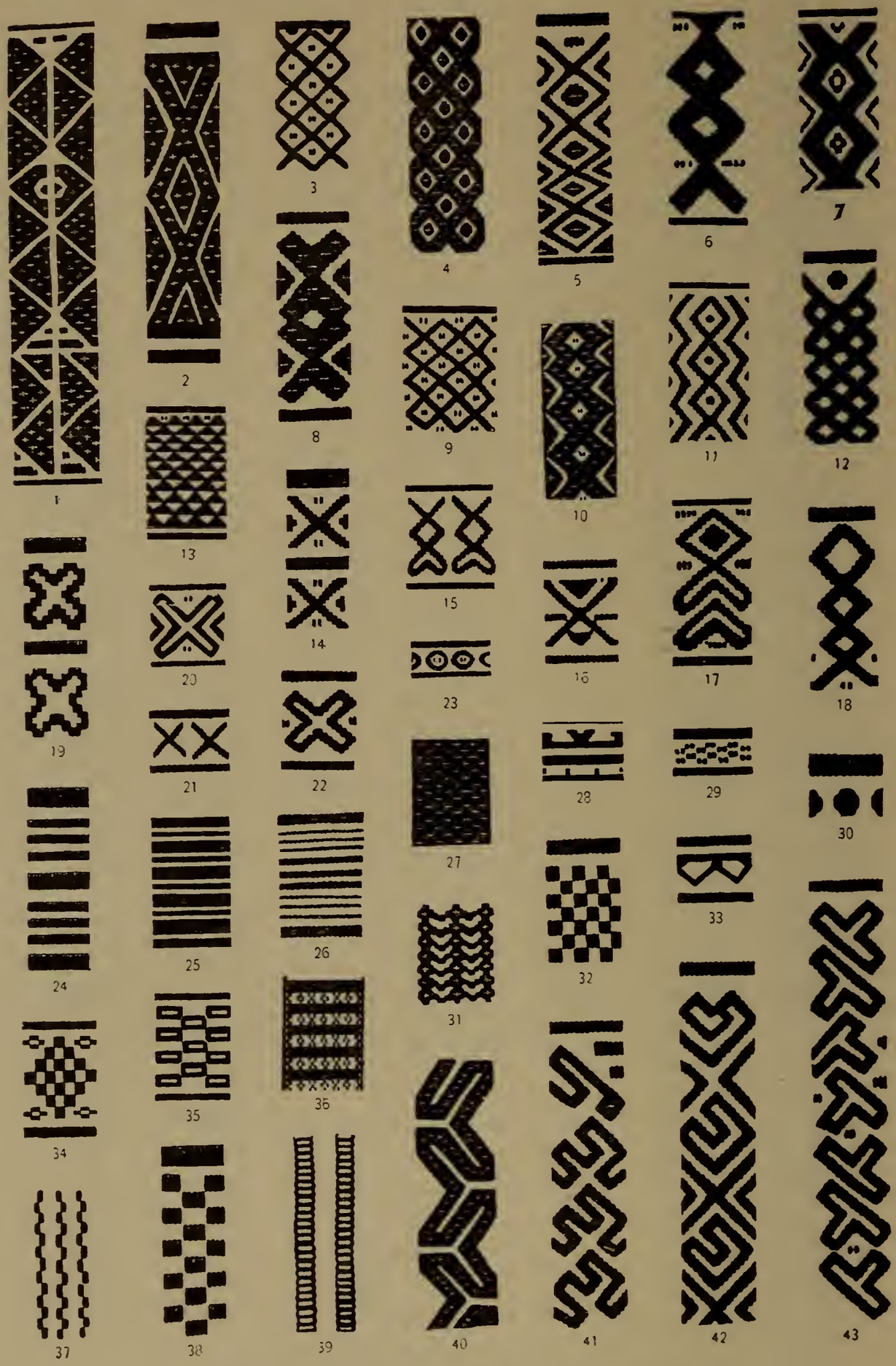
Plate	Figure	
CXXV	44	palm-wood steps of the house ladder (lya'tena)
		belt (tcū'mbī). This term should be tcū'mbī pīlya, which signifies belt design and is applicable to any design which appears on a belt
CXXVI	1	balya'lyac (untranslatable)
		eggs of a species of lizard called bīmbū'ka (bī'mbū napīpū)
	2	hū'rūlara, hū''la (untranslatable)
		eggs of a species of lizard called bīmbū'ka
	3	(bī'mbū napīpū)
		pū'ka ka (this appears to be really ka' pūka which means small fruit)
		big zigzag (e' dētcū)
		balya'lyac (untranslatable)
		hū'rūlara, hū''la (untranslatable)
	4	hū'rūlara, hū''la (untranslatable)
		balya'lyac (untranslatable)
		pū'ka ka (apparently signifies small fruit)
	5	foot of a small species of lizard (bī'mbū nyapa)
		e hū''la (e signifies large; hū''la is untranslatable)
	6	egg of a small species of lizard (bī'mbū napīpū)
		hū'rūlara, hū''la (untranslatable)
	7	balya'lyac (untranslatable)
		tyū'ndyu tcī lara (untranslatable)
	8	balya'lyac (untranslatable)
		tyū'ndyū tcī lara (untranslatable)
		handkerchief design (tē'mbū pīlya)
	9	balya'lyac (untranslatable)
		tyū'ndyū tcī lara (untranslatable)
		hū''lara (untranslatable)
		handkerchief design (te'mbū pīlya)
	10	balya'lyac (untranslatable)
		belt design (tcū'mbī pilya). (This term is applied to any design on a belt, regardless of the nature of the design)
		big zigzag (e' dētcū)

Plate	Figure	
CXXVI		palm-wood steps of a house ladder (lya'tena). (This term applies to the horizontal lines which form part of this design)
		tyū'ndyū tcī lara (untranslatable)
	11	balya'lyac (untranslatable)
		te'pū balyalya (untranslatable)
		pala'c lara (untranslatable)
	12	balya'lyac (untranslatable)
		tyū'ndyū tcī lara (untranslatable)
	13	balya'lyac (untranslatable)
		horizontal design (de'' pañ bīlya)
		tyū'ndyū tcī lara (untranslatable)
	14	balya'lyac (untranslatable)
		handkerchief design (te'mbū pilya)
	15	balya'lyac (untranslatable)
	16	balya'lyac (untranslatable)
		belt (tcū'mbī). (This term should be tcū'mbī pilya, signifying belt design. It is equally applicable to any design which appears on a belt)
	17	balya'lyac (untranslatable)
		belt (tcū'mbī). (This term should be tcū'mbī pilya, signifying belt design. It is equally applicable to any design which appears on a belt)
	18	No interpretation obtained
	19	No interpretation obtained
	20	No interpretation obtained
	21	zigzag (dē'tcū). See pl. CXXV, fig. 15, above
		belt (tcū'mbī). (This term is applicable with equal propriety to all designs appearing on belts; its full form is tcū'mbī pilya)
	22	eggs of a species of small lizard called bīmbū'ka (bī'mbū napīpū)
		tyūlya'lya (untranslatable)
		hū'rūlara, hū''la (untranslatable)
		pū'te wīlûcla (pū'te signifies hamper-shape basket; wīlû'cla is untranslatable)
	23	balya'lyac (untranslatable)
		ladder (lya'pī)

Plate	Figure	
CXXVI	24	No name obtained
	25	No name obtained
	26	No name obtained
	27	No name obtained
	28	belt (tcū'mbī). (This term applies to any design which appears on a belt; its full form is tcū'mbī pīlya)
		tyūlya'lya (untranslatable)
	29	mō'pītcīpapa, mōpī ke'nū tcīpapa. (The carved stick used as an implement with which to apply the red and yellow face paint)
		tyūlya'lya (untranslatable)
		balya'lyac (untranslatable)
		tyūm bī'lya (bī'lya signifies design, tyūm appears to come from te'tcūa, signifying pitigua). (The connection of the design and name here is not very clear)
	30	handkerchief design (te'mbū pīlya)
		tyūlya'lya (untranslatable)
		pala'lara (untranslatable)
	31	handkerchief design (te'mbū pīlya)
		tyūlya'lya (untranslatable)
	32	balya'lyac (untranslatable)
		tyūm bī'lya (bī'lya signifies design, and tyūm appears to be derived from te'tcūa, signifying pitigua)
	33	No signification was obtained for this elaborate design
	34	balya'lyac (untranslatable)
	35	No signification obtained
	36	No signification obtained
	37	No signification obtained
	38	handkerchief design (te'mbū pīlya)
		tyūlya'lya (untranslatable)
	39	No signification obtained
	40	handkerchief design (te'mbū pīlya)
		tyūlya'lya (untranslatable)
	41	zigzag (dē'tcū). See pl. CXXV, fig. 15, above
		te'pū balya'lya (untranslatable)
		balya'lyac (untranslatable)
		fruit (pū'ka)



CLOTH DESIGNS; GEOMETRIC FIGURES



CLOTH DESIGNS: GEOMETRIC FIGURES

Plate	Figure	
CXXVI	42	pala′cla (untranslatable)
		belt (tcū′mbī). (This term in full is tcū′mbī pīlya, signifying belt design, and is applicable to all designs appearing on belts)
	43	balya′lyac (untranslatable)
		hō′lara (untranslatable term)
	44	handkerchief design (te′mbū pilya)
		tyūlya′lya (untranslatable)
	45	tyūlya′lya (untranslatable)
		tyū′ndyū tcī lara (untranslatable)
	46	canoe design (kūm bī′lya)
		handkerchief design (te′mbū pilya)
	47	handkerchief design (te′mbū pilya)
		te′mbū balyalya (te′mbū signifies handkerchief; balya′lya is untranslatable)
	48	pala′tcū or palû′c lara (untranslatable)
	49	pala′tcū (untranslatable)
		ears (pū′ñge)
		centipede (se′pīnde)
	50	No signification obtained
	51	No signification obtained
CXXVII	1	big zigzag (e′ dētcū)
		e pala′tcū (e signifies big; pala′tcū is untranslatable)
		boa constrictor (we′sū)
	2	e hū′rūlara (e signifies big; hū′rūlara is untranslatable)
		pitigua design (tyūm bī′lya) (tyūm comes from te′tcūa, meaning pitigua)
	3	ba′ndilas (a certain basketry technic). (This particular basketry technic is a kind of openwork which produces small squares similar to those shown here. It is clearly a case of the adaptation of this technic to this textile)
		hū′rūlara, hū′′la (untranslatable)
	4	ba′ndilas (a certain basketry technic). See fig. 3 above
		zigzag (dē′tcū). (This interpretation seems doubtful)
	5	hū′rūlara, hū′′la, hū′rūla (untranslatable)

Plate	Figure	
CXXVII	5	eye (kapū'ka)
		kapūka ya dē'tcu (eye ya zigzag)
	6	hū'rūlara, hu''la (untranslatable)
	7	e hū''la, hū''la (untranslatable)
	8	hū'rūlara, hū''la, pala'lac (untranslatable)
	9	ba'ndilas (a certain basketry technic). See fig. 3 above
	10	hū'rūlara, hū''la, e hū''la, ho' lara (untranslatable)
	11	zigzag (dē'tcū)
		hū'rūlara, hū''la (untranslatable)
	12	ba'ndilas (a certain basketry technic). See fig. 3 above
		crab design (ne' pīlya)
		nim bī'lya (untranslatable)
		zigzag (dē'tcū). (The connection seems doubtful)
	13	ba'ndilas (a certain basketry technic). See fig. 3 above
	14	pala'la, pala'lara, pala'tcū (untranslatable)
	15	hū'rūlara, hū''la (untranslatable)
		turtle (pītcī'lī)
	16	No interpretation obtained
	17	hū'rūlara, hū''la (untranslatable)
	18	No interpretation obtained
	19	pala'tcū, tapū'lyū (untranslatable)
	20	cross (karū'sa, from the Spanish cruz)
		pala'tcu (untranslatable)
		top (tōmbe'ta, from the Spanish trompo)
	21	pala'cla (untranslatable)
		belt (tcū'mbī). (This term in full is tcū'mbī pīlya, belt design, and is equally applicable to all designs occurring on belts)
	22	big zigzag (ē' dētcu)
		i'clabō ñ (iron used with flint in striking fire)
	23	eye (kapū'ka)
	24	lya'tena (the palm-wood steps of a ladder)
		ne' pīlya tyūndyū tcī lara (ne' pīlya signifies crab design; the remainder of the term is untranslatable)

Plate	Figure	
CXXVII	24	tyū'ndyū tcī lara (untranslatable)
		ladder (lya'pī)
		crab design (ne' pīlya)
	25	lya'tena (the palm-wood steps of a ladder)
		ne' pīlya tyūndyū tcī lara (ne' pīlya signifies crab design; the remainder of the term is untranslatable)
		ladder (lya'pī)
		crab design (ne' pīlya)
		tcū'mbī delam ba''ta (tcū'mbī signifies belt; the remainder of the term is untranslatable)
	26	lya'tena (the palm-wood steps of a ladder)
	27	crab design (ne' pīlya)
		nim bī'lya (untranslatable)
	28	ka'pū tcī lara (to turn the eyesi n an upward direction)
		lya'tena (the palm-wood steps of a ladder)
	29	delam ba''ta (untranslatable)
		lya'tena (the palm-wood steps of a ladder)
	30	crab design (ne' pīlya)
	31	zigzag (dē'tcū). (The connection seems doubtful)
		The stick used to apply face-paint; it is called mō'pītcīpapa, mōpī ke'nū tcīpapa, and mū'pī kenū tcīpapa, all variants of the same term
	32	crab design (ne' pīlya)
		nim bī'lya (untranslatable)
		crab eyes (ne' kapūka)
	33	zigzag (dē'tcū)
	34	crab design (ne' pīlya)
	35	No interpretation obtained
	36	No interpretation obtained for this design as a whole. Horizontal bars of this kind are called lya'tena, meaning the palm-wood steps of the house ladder, and the small rectangles are called ne' pīlya, signifying crab design, or nim bī'lya, in which nim is a term of unknown signification
	37	crab design (ne' pīlya)

Plate	Figure	
CXXVII	37	crab design white cotton (ne′ pīlya fībañ ūtcūa)
		nim bī′lya (untranslatable)
		crab design technic (ne′ pīlya decīma)
		eye (kapū′ka)
	38	eye (kapū′ka)
		crab eye (ne′ kapūka, nē′lū kapūka)
		dū′lalara kapūka, kapūka dala′la ke′tū (kapū′ka in each of these terms signifies eye. The remaining portions of these terms are untranslatable)
		balya′lyac (untranslatable)
		belt design (tcū′mbī pīlya). (This term belt applies equally to all designs occurring on belts)
	39	No interpretation obtained. Horizontal bars of this kind are usually called lya′tena, which signifies the palm-wood steps of a house ladder. As a matter of fact the design from which this figure was taken was a very small one and it is doubtful if this name would apply
	40	zigzag (dē′tcū)
		i′clabō′ñ (iron used with flint in striking fire)
	41	i′clabō′ñ (iron used with flint in striking fire)
	42	i′clabō′ñ (iron used with flint in striking fire)
		zigzag (dē′tcū)
		The rectangular closed figures are called kū′tca petī; kū′tca signifies dog, but pe′tī is untranslatable. The crossed lines between these rectangular figures are called pala′la, a term of unknown signification
	43	i′clabō′ñ (the iron used with flint in striking fire)

Glossary of Manta Design Names

bait, karna'da. Also said to be the name of a certain crustacean, called in Spanish camaron brava. CXXIV, 55.

balya'lyac (untranslatable). CXXIII, 11; CXXVI, 1, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 23, 29, 32, 34, 35, 41, 43; CXXVII, 38.

basket. See pū'te.

belt or girdle, tcū'mbī, a term that may be used as part of the name of any design on a belt. CXXV, 44; CXXVI, 16, 17, 21, 28, 42; CXXVII, 21, 38.

bird, pī'tcū. CXXIV, 20, 23, 24, 29, 31, 43; CXXV, 6, 10, 13, 14.

la'pī'tcū. A small black and yellow bird, a good singer, much kept as a pet by the Cayapa. Spanish, pichichu. CXXIV, 44.

tū'mbītcīlīlī. A small black bird with red beak. CXXIV, 39.

frigate bird, nyambīwa'tū. CXXIV, 34.

boa constrictor, we'sū. CXXVII, 1.

burro, bū'rū. CXXIV, 11.

buzzard, kū'ndūrūrū, petyū'tyū; Spanish, gallinaso. CXXIV 36, 44.

canoe design, kūm bī'lya: kūm, from kū'lo, canoe. CXXVI, 46.

centipede's hand, se'pīnde tyapa; hand (not leg) = tyapa'pa. CXXIV, 57; CXXVI, 49.

chicken, walya'pa. CXXIV, 26, 37.

color. Frequently an informant gave as the name of a particular design the name of the color of the material from which it was made. Such names, of course, have no significance in the interpretation of designs, but are of interest in that often they were the only ones obtainable. The names particularly used in this connection were:

te'nda, green thread, from a small shrub called te'nda tcī, the leaves of which provide the pigment used in coloring this thread.

ka'kō, lavender thread, this color being obtained from a small periwinkle-like mollusk.

The names for other colors were almost never used in this manner.

cow, waga'ra, from Spanish vaca. CXXIII, 35; CXXIV, 10, 15.

crab, ne'lū, the small red land-crab. CXXIII, 38; CXXIV, 55, 56, 58.

tepuī ne'lū, a certain species from the coast region. CXXIV, 55.

crab eye, ne'kapūka, ne'lū kapūka. This refers to the eye of the small red land-crab called ne'lū. CXXVII, 32, 38.

crab design, ne' pīlya: ne from ne'lū, crab; pī'lya, design. CXXVII, 12, 24, 25, 27, 30, 32, 34, 37.

ne' pīlya tyūndyū tcī lara: ne' pīlya, crab design; the remainder is untranslatable. CXXVII, 24, 25.

crab design technic (literally), ne' pīlya decīma. CXXVII, 37.

crab design white cotton (literally), ne' pīlya fībañ ūtcūa. CXXVII, 37.

cross, karū'sa, from Spanish cruz. CXXVII, 20.

deer, ma'na. CXXIII, 40, 41; CXXV, 8, 9, 10, 12, 13.

delam ba''ta (untranslatable). CXXVII, 29.

design. In many cases informants simply gave the term pī'lya, or bī'lya, which signifies design or pattern. It would appear that it was employed in cases where the design was of unknown signfication, or where it was newly introduced. Such a general term is, of course, applicable to all patterns.

belt design, tcū'mbī pīlya. This term applies to any pattern on a belt or girdle, regardless of its form. CXXVI, 10; CXXVII, 38. See belt.

horizontal design, de''pañ bīlya. CXXVI, 13.

dog, kū'tca. CXXIII, 45; CXXIV, 7, 19; CXXV, 12.

kū'tca petī: pe'tī is untranslatable. The rectangular figures of this pattern are referred to by this name. CXXVII, 42.

dove, Spanish, paloma. CXXIV, 29, 31.

pactū'kū. A reddish species as large as a chicken. CXXIV, 25.

wa'pū'pū. A small reddish species. CXXIV, 24, 42.

duck, Spanish, pato. CXXIV, 38.

dū'lalara kapūka (dū'lalara is untranslatable; kapū'ka, eye). CXXVII, 38.

ear, pū'ñge. CXXVI, 49.

egret, white, ka''tsū; Spanish, garsa. CXXIV, 45, 29.

e hū''la (e, big; hū''la, untranslatable). CXXVI, 5; CXXVII, 7, 10.

e hū'rūlara (e, big; the remainder is untranslatable). cxxvii, 2.
e pala'tcū (e, big; the remainder is untranslatable). cxxv, 36; cxxvii, 1.
eye, kapū'ka. cxxv, 17, 23, 27, 32; cxxvii, 5, 23, 37, 38.
kapūka dalalake''tū (kapū'ka, eye; the remainder is untranslatable). cxxvii, 38.
ka' kapūka, "little eye." The small diamond-shape designs on mantas, etc. cxxv, 23, 27.
ka'pūka ya dētcū (kapū'ka, eye; the remainder is untranslatable). cxxvii, 5.
ka'pū tcī lara, to turn the eyes in an upward direction, i.e., to look decidedly upward. cxxvii, 28.
feast table, pa'kīgi, a contraction of piñba kīkī. cxxv, 20.
fruit, all classes, pū'ka. cxxvi, 41.
girdle. See belt.
goat, tcī'bū; Spanish, chivo. cxxiii, 26, 27; cxxiv, 9, 36.
guinea pig, a''tse. cxxiv, 1, 2, 3, 4, 5, 6, 8, 10, 11.
handkerchief, te'mbū balya'lya: te'mbū, a contraction of tembū'pū, handkerchief; balya'lya, untranslatable. cxxiv, 21; cxxvi, 47.
handkerchief design, te'mbū pīlya: tembū'pū, handkerchief. cxxiv, 21; cxxv, 39; cxxvi, 8, 9, 14, 30, 31, 38, 40, 44, 46, 47.
hawk, hūya'lyū; Spanish, gabilan. cxxiii, 41.
hō'lara (untranslatable). cxxiii, 28, 43; cxxvii, 10.
horse, kawa'lyū; Spanish, caballo. cxxiii, 24, 25, 26, 27, 30, 31, 33, 34, 36, 37; cxxiv, 7, 14, 21, 28, 36; cxxv, 8, 14.
hū''la (untranslatable). cxxiii, 17, 21; cxxv, 32, 35, 38; cxxvi, 2, 3, 4, 6, 22; cxxvii, 3, 5, 6, 7, 8, 10, 11, 15, 17.
hū'lara (untranslatable). cxxvi, 9.
human being, tca'tcī. cxxiii, 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 15, 16, 19, 24, 28, 30, 43; cxxiv, 5, 6, 17; cxxv, 1, 2, 10.
hū'rūla (untranslatable). cxxvii, 5.
hū'rūlara (untranslatable). cxxiii, 17; cxxv, 32, 35, 38; cxxvi, 2, 3, 4, 6, 22; cxxvii, 3, 5, 6, 8, 10, 11, 15, 17.
kūē'bū (untranslatable). cxxiv, 22.
kū'tca pe'ti (kū'tca, dog; pe'tī, untranslatable). The rectangular figures of this pattern are thus referred to. cxxvii, 42.
ladder, lya'pī; Spanish, escalera. cxxvi, 23; cxxvii, 24, 25. lya'tena, i.e. palm-wood steps of a house-ladder, cxxv, 15, 44; cxxvi, 10; cxxvii, 24, 25, 26, 28, 29.

lizard. cxxiv, 13.
bīmbū'ka, a large species; Spanish, piande. cxxiv, 58; cxxv, 36.
bī'mbū napīpū, i.e., egg of a lizard called bīmbū'ka. cxxvi, 1, 3, 6, 22.
bī'mbū nyapa, foot of a lizard called bīmbū'ka. cxxvi, 5.
monkey, cu'rī, a small species; Spanish, machin and mīco. cxxiii, 22, 23, 29, 31, 39; cxxiv, 16; cxxv, 3, 4, 5, 6.
wo'cū, wa'cū, a species larger than the machin but smaller than the large black monkey called mongon; Spanish, mono. cxxiii, 22, 38, 45.
ne'lū kapūka. See crab eye.
nim bi'lya (untranslatable). This design is one of those most frequently employed. cxxvii, 12, 27, 32, 37.
pala'cla (untranslatable). cxxvi, 42; cxxvii, 21.
pala'c lara (untranslatable). cxxvi, 11.
pala'la (untranslatable). cxxiii, 9, 10; cxxvii, 14, 42.
pala'lac (untranslatable). cxxvii, 8.
pala'lara (untranslatable). cxxvi, 30; cxxvii, 14.
pala'ra (untranslatable). cxxv, 38.
pala'tcū (untranslatable; the only definition obtainable was the Spanish term garavata). cxxiii, 21; cxxv, 38; cxxvi, 48, 49; cxxvii, 14, 19, 20.
palû'c lara (untranslatable). cxxvi, 48.
pelican, nana''ka; Spanish alcatraz. cxxiii, 38, 42; cxxv, 21, 25, 26, 27, 29, 30, 33, 35, 36, 37, 38, 40, 41.
petyū'tyū. See buzzard.
pilya dē'we: pī'lya, design; dē'we, possibly related to de'tcū, zigzag. cxxv, 31.
pitigua, etcūm bī'û: probably related to te'tcūmb īlya, from te'tcūa, pitigua, and bī'lya, design. cxxv, 21.
pū'ka ka (untranslatable). cxxvi, 3, 4.
pū'te wīlû'cla: pū'te, hamper-shape basket; wīlû'cla, untranslatable. cxxvi, 22.
ray, tongue of sting-ray, tyū'wī nī''ka. cxxv, 34.
scorpion, alaga'ra; Spanish, alacrán. cxxiv, 49, 50.
se'rañ dē'tcū (untranslatable). cxxv, 22.
sheep, bōrrī'gō, usually called bōrrī'gō by the Cayapa, but called also ōī'ca from Spanish oveja. cxxiv, 1, 4, 5, 6, 8, 16.
snake, pīnī. cxxv, 21.
spider, mū'*t*ele; Spanish, araña. cxxiii, 12; cxxiv, 46, 47, 49.

steel, ī'clabō'ñ, i.e., iron used with flint in striking fire. CXXVII, 22, 40, 41, 42, 43.

stick, with which achote face-paint is applied, mō'pītcīpapa, mōpī ke'nū tcīpapa, mū'pī kenū tcīpapa. CXXVI, 29; CXXVII, 31.

tapū'lyū (untranslatable) CXXVII, 19.

tcū'mbi delam ba''ta (tcū'mbi, belt or girdle; delam ba''ta, untranslatable). CXXVII, 25.

technic, ba'ndilas, a certain basketry technic. CXXVII, 3, 4, 9, 12, 13.

te'pu balya'lya (untranslatable). CXXVI, 11, 41.

toad, sa'pū, from Spanish sapo. CXXIII, 4, 17, 18, 19, 20, 59.

top, tombē'ta, from Spanish trompo. CXXVII, 20.

turkey, domestic, kaste'lya walyapa, literally Spanish or Castilian chicken. CXXIV, 22.

turtle, pītcī'lī; Spanish, tortuga. CXXIV, 53, 54, 59; CXXVII, 15.

tyūlya'lya (untranslatable). CXXVI, 22, 28, 29, 30, 31, 38, 40, 44, 45.

tyūm bi'lya (tyūm, probably from te'tcūa, pitigua; bī'lya, design). CXXV, 20; CXXVI, 29, 32; CXXVII, 2.

tyū'ndyū tcī lara (untranslatable). CXXIV, 17; CXXVI, 7, 8, 9, 10, 12, 13, 45; CXXVII, 24.

zigzag (generic), dē'tcū. This term is usually preceded by an adjectival term which indicates the particular kind of zigzag; viz., ē' dētcū, se'rañ dētcū, ūyū'mī dētcū, de''pañmī dētcū. CXXV, 15, 16, 17, 19, 20, 23, 25, 26, 28, 29, 30, 31, 33, 34, 35, 37, 41, 42, 43; CXXVI, 21, 41; CXXVII, 4, 11, 12, 31, 33, 40, 42.

dē'tcū serañ tsūa; (dē'tcū, zigzag; no definite translation for the remainder of the term could be obtained). CXXV, 29.

ē' dētcū; literally, big zigzag; given also as crossed zigzag, though this meaning is doubtful. CXXV, 18, 27, 32, 40; CXXVI, 3, 10; CXXVII, 1, 22.

de''pamī dētcū, de''pañmī dētcū; horizontal zigzag. CXXV, 34.

GOVERNMENT

In large measure the mode of government now in vogue among the Cayapa is based on the Spanish system at present employed in Ecuador; consequently we find in each of the three divisions of the Cayapa the following officials: Gobernador, secretario de la gobernación, teniente político, alcalde, comisário, capitán, sargento. The office of each of these officials is hereditary and on the death of the incumbent passes to his eldest living son or, if he has no sons, to his eldest living brother. In case he has neither son nor brother, the office passes to the eldest son of his eldest deceased brother, and should no such son be living, it passes to the eldest of his nearest male relatives, thus keeping the office always within the family. This system of succession is obviously an aboriginal one and was naturally retained when the new form of government was engrafted upon the old.

It sometimes happens that the hereditary candidate for an office does not wish to assume it. In such event it passes to the next in line in the order mentioned, or, by common consent of the heads of the related familes concerned, it may pass out of this order. Ordinarily such a condition does not arise, but instances have been known where an hereditary candidate declined to accept an office to which he was legally entitled, and which it was not only his privilege but also his duty to accept.

The Spanish form of government has existed for many years, so that it is now difficult to determine exactly what the aboriginal Cayapa government was. It would appear, however, that there were but three classes of

officials: First, a chief, known as ū′nyī or ū′mī, and now gobernador; second, one or more sub-chiefs, casawa′lyī, now called gobernador nuevo; third, a class which might be termed officers of the law, called tca′itala. All the officers of the present Spanish form of government, other than the gobernador and the gobernador nuevo, are classed under the last head, and in reality all serve the same purposes as did the ancient tca′itala.

The center of government inheres in the chief, no matter where he may reside, and practically all matters, but especially matters of importance, are referred to him.

The Cayapa are separated, geographically and politically, into three divisons, each with its section of the river and its particular village which is used only at times of fiestas or for other gatherings. These divisions are those of Punta Venado, Sapayo Grande, and San Miguel, these designations being taken for convenience from the names of their respective villages in the order in which they are met in going up the Rio Cayapas. A part of Punta Venado is shown in pl. VIII, while a distant view of the village from the river is shown in pl. IX. This is the largest and most important of the three villages. In pl. X is presented a view of a part of Sapayo Grande, with the chief's house in the left foreground.

In each of these villages the chief has a large house, and it is here that most matters of importance are settled, justice is dispensed, and punishment inflicted. In such a house there is a large special room, at one end of which is a heavy stocks for the confinement of prisoners when necessary. In the Cayapa country the stocks is strictly

a Spanish institution, so far as can be learned, and has no Cayapa name, but is always called by the Spanish term cepo, or, as it is rendered locally, se′pō. So far as known it was introduced among the Cayapa by early missionaries.

In speaking of ceremonies (page 392), detailed descriptions are given of the methods of punishment, which theoretically is meted out only by the chief and the subchief. The remaining officers of the government, however, take a hand in the actual punishment when asked to do so by the chief, though their special duty is to apprehend and bring the offenders to justice, to keep order at fiestas and other gatherings, and generally to execute the laws devised by the chief, whose authority is supreme and whose word in all matters is absolutely binding. His attitude, however, is in no way oppressive; on the contrary, he displays great deference to public opinion and conducts the affairs of government in a harmonious and satisfactory manner. Perhaps the operations of the Cayapa governmental machinery are shown to best advantage in the settlement of what may be termed civil difficulties, for, as has been previously pointed out, there are few fixed laws among the Cayapa, largely for the reason that few crimes are committed. The laws are more in the nature of canons of ethics than statutory enactments, and they may be varied to a certain extent by public opinion concerning the particular case in hand. The Cayapa maintain that they have no punishment for theft, because theft does not exist either among themselves or against their neighbors. This reputation is borne out by the whites and negroes of the region, who

declare the Cayapa absolutely honest. It is claimed also that murder and other major crimes are entirely unknown among them.

On the other hand, there are strict rules with respect to marital relations, any infringement of which meets with severe punishment. The details of this phase of Cayapa life will be discussed in dealing with the subject of marriage. The Cayapa themselves claim that in aboriginal times the same regulations in respect to these matters were in vogue, but presumably they may have been at least strengthened, if not considerably influenced, by the rigid church laws introduced by missionaries.

It is said that formerly, when the Cayapa were a united mountain people residing in a village community, there was but one chief and one government for all, but that soon after they settled along the banks of the river they became segregated into the three divisions as above mentioned. There then arose the three separate villages for fiestas and other gatherings, and the three separate and independent governments. No special reason for this separation is given by the Cayapa, other than that it was more convenient than to have a single central government; and no explanation could be obtained as to how the officials of the three separate governments were first appointed or elected.

It is said that in aboriginal times the inauguration of a new official was attended by no special ceremony, but that he automatically assumed the duties of his office on the death of his predecessor. At present, however, such a person enters on these duties only after having been duly inducted by the priest during his annual visit to the

village. The successor of an official is definitely known long before the death of the latter, but an official vacancy is not actually filled until the coming of the priest. Then, in the presence of all the other officials and anyone else who may wish to be present, the priest delivers an address in which he names the new official, announces his duties and privileges, commends him to the respect of the people, and charges him with the duties and responsibilities which he is about to assume. On the death of the chief, for instance, his duties are relegated to some other official, usually one of the "alcaldes," until such time as the priest shall arrive and inaugurate a successor.

None of these officials are supposed to receive compensation other than the honor and respect in which they are held. The chief, however, usually levies fines upon offenders, of which he takes personal possession and could, if he so desired, use a portion of them for his private needs, since no special account of such matters is kept by anyone. As a matter of fact such a thing rarely or never happens; on the contrary the chief uses the fines for paying the services of officers of the law whom he may send on missions of various kinds, such as bringing culprits to justice, settling disputes among his people, and the like. A portion of the money he uses also for the payment of shamans whom he employs now and then to expel dangerous spirits from his village, from deep pools in the river, or from other places where these mysterious beings are supposed to endanger the lives of the people at large. At the present time, when coins of Ecuador and Colombia are comparatively easy to obtain, fines are paid in money, but in earlier times they were always paid in commodities.

BIRTH

Contrary to the conditions prevailing among many aboriginal peoples, among the Cayapa there are few restrictions associated with birth. Parturition is usually in a more or less erect position, the woman sitting upon a low stool of the type shown in pl. LXXXIII, and no medicines are taken, excepting sometimes a small glass of hot, strong rum. The woman is attended by other women of her family, but submits to no ceremonial restrictions; indeed the only prohibitions to which she is subject are those against bathing, and eating meat. She lies still for a period varying from a day to about a week, but during this time and subsequently she may prepare any food she desires, may feed herself, comb her own hair, touch her own face, and perform various other acts which are forbidden under like circumstances among many other aboriginal peoples.

Couvade, which is so rigidly observed among many South American tribes, is not practised here. In fact, during his wife's confinement a man appears to be entirely unrestricted: he follows his usual pursuits, and even hunts and fishes, two occupations which by a great many tribes are especially forbidden to fathers of new-born children.

With respect to the new-born child itself certain customs are observed. Much care is taken in connection with the umbilicus and the placenta. The cord is cut at a distance of three or four inches from the body, and the end is dipped in hot grease and securely tied. The afterbirth is immediately wrapped in leaves and is

either carried far into the hills and there deposited in some lonely, out-of-the-way spot, or it is placed to dry in the upper part of the house for about a month, when it may be thrown away in a place where no one is likely to find it. When the umbilicus finally sluffs from the body, it is kept in the house for a month or so and also thrown away in some secluded spot.

This great care that no one shall come upon either the umbilical cord or the afterbirth is apparently not due to fear that the child or a member of its immediate family will be injured if either should be found, but it is claimed that the magic effect upon a person encountering either would be very serious, and might even result in death. No evidence could be obtained that would point to the use of either the umbilicus or the placenta by shamans or others for bringing about magic spells or other malevolent effects.

Immediately after its birth, the child is bathed in warm water and its entire face is painted with red achote, but neither the child nor the mother is obliged later to undergo any purification or other ceremony.

NAMES

According to their profession of the Roman Catholic faith the Cayapa baptize their children for the first time within a few days after birth. This first rite is performed by a man and a woman, special friends of the family, who are selected by the parents. If the child is a boy, he is held by the man who is to become his godfather while the woman who is to become his godmother

baptizes him with a tumbler of water as she gives him his name, which is almost invariably the given name of the godfather. If a girl, the child is held by the godmother, baptized by the godfather, and given the name of the godmother.

A child may be, and usually is, called by its first baptismal name, but sooner or later in its babyhood some act or circumstance connected with its life will appeal to the members of the family as particularly ludicrous or interesting. Its name is thereupon changed, it being called by the name of this act or circumstance to the almost total exclusion of its baptismal name. At the first opportunity the child is baptized by a priest, and then receives from him its true Christian name, which is usually that of the patron saint of the day upon which the child was born. Some months, however, may elapse before this second christening, since it is possible to have such a baptism only when a priest makes a visit to the region or when a part of the family has occasion to go to Esmeraldas or to some other point where a priest resides. In spite of the fact that the child may now have two Christian names, it almost invariably happens that some nickname given to it in the nature of a joke clings to it, perhaps for the rest of its life, and always at least until after marriage. This nickname may at any time be changed according as some new propensity is displayed by the child, or some new incident occurs which appeals to its associates or to the family.

Such a nickname persists usually until the person becomes a father or a mother, when the name is immediately changed and the person is no longer known by his or

her original name, but as the father or mother of this first-born child. Thus, the chief of the Punta Venado division of the Cayapa is known by the Christian name Antonio Napa, but is almost invariably called pī′tcū-apa, signifying "father of pī′tcū." Correspondingly his wife is known as pī′tcū-ama, "mother of pī′tcū." Such a name usually persists regardless of the names of any of the younger children and regardless of whether or not the eldest child still lives. In the case cited, the eldest son, pī′tcū, died several years ago and there are several younger children in the family, but the names pī′tcū-apa and pī′tcū-ama still persist. Now and then a person is found whose original nickname is used even after the birth of his children, but this is very exceptional.

PUBERTY

As in the case of birth, there appear to be almost no restrictions upon or ceremonies for either sex on reaching puberty, which is again contrary to the customs of most aboriginal peoples. Some even maintain that there are absolutely no restrictions, but others claim that girls at the age of puberty are prohibited for a short period from going about and from bathing. This latter statement seems the more probable, in view of the fact that during their menstrual periods the older women are subject to the same restrictions, though they are not otherwise restricted in their actions at such times.

MARRIAGE

When a young man or a young woman desires to marry a certain person, all work other than that absolutely necessary, and all social relations with other individuals, are at an end. Such a person sits throughout the day without speaking to anyone, and no matter how much he or she may be addressed or made fun of, etiquette does not permit such a person to respond or even to laugh.

It sometimes happens that a young man is desirous of marrying a woman who cares nothing for him. In such a case, if his ordinary endeavors to gain her interest and attention fail, he resorts to the use of certain sweet-scented herbs, the woods of certain trees, and various other objects, which are supposed to have magic power to attract and to give him good luck in such matters. He wears such charms about his person, especially attached to his necklaces.

A young man in love bides his time until the other members of his family have retired for the night, when he takes his canoe and paddles to a point near the house of the young woman he wishes to marry. On nearing her home he sings softly certain magic love-songs and then cautiously approaches the house. He then, according to some informants, attracts her attention by one means or another and endeavors to persuade her to leave the house with him for a time. According to others, he cautiously enters the house and passes a part of the night with her under her own mosquito canopy. In either case they part toward morning, so that the lover is able to return to his own home without the

knowledge of his family. These visits are repeated for some time, when the young couple announce their desire to marry and obtain the consent of their respective parents. After this, conditions very largely govern their procedure. By some it is said that at present they go immediately to the house of the bride's or the groom's father, or to a new house of their own as soon as one can be built, and there live as man and wife without any special ceremony; indeed the only ceremony celebrated is that of the church on the next annual visit of the Catholic priest. Others maintain that, having obtained the consent of all parties concerned, some time elapses before what may be called the preliminary wedding feast and ceremony. In this interval the young man and his friends must hunt and procure game, which is dried for the feast, and must provide presents for the parents and other relatives of the bride. The bride, on the other hand, provides certain of the other foods, such as plantains and corn, and she and her family make gifts to the family of the groom. There is no exchange of presents between the bride and the groom, however, and there is nothing which can in any way be construed as a purchase of the bride. Finally the relatives and friends of the contracting couple assemble, and a feast of from one to two or three days is held. At this feast the young couple are brought in and are given each ten lashes with a cat-o'-nine-tails by the chief. This whipping is considered as a consummation and legalization of their marriage, so far as civil procedure is concerned. It seems probable that this custom is a survival of aboriginal times and that the marriage ceremony has not been so

greatly modified by intrusive religious ideas as have many other features of Cayapa culture. With the coming of the priest, on the occasion of his annual visit, the regular church marriage rite is performed. At this ceremony there is further chastising of the contracting parties by the chief or by some one delegated by him.

On the occasion of the annual visit of the priest to one of the Cayapa pueblos, usually in August or September, a fiesta of from one to three weeks is held, during which it is customary for couples who have been married between the time of the priest's last visit and the present occasion to celebrate a marriage feast. Should it be inconvenient to celebrate the marriage feast at this particular time, it may be held at any other gathering of the people at the village, or it may even be deferred until the next annual visit of the priest. These marriage feasts are the occasion of much merrymaking. Quantities of food, rum, and tobacco are provided, and the whole village celebrates for a day or two. During the forenoon of the first day, a table, made by spreading upon the floor of the large assembly and dance hall of the chief's house a covering of hoja blanca, is filled with all kinds of food, among them being one special dish of eggs, prepared much after the manner of scrambling. At this feast a most exceptional departure from the rule of the separation of the sexes at public gatherings is observed. At all other feasts, men and boys only are permitted to enter the room in which the feast is held, but on this occasion the bride and her godmother are present. The mother of the bride, however, does not enter. Another interesting feature of this feast is that,

other than the bridegroom and his godfather, and the bride and her godmother, all of those seated at the table are the heads of families. At the head of the table are seated the chief and three or four others of the principal officials. Along the side of the table and immediately to the right of these officials are seated, in order, the godfather of the groom, the groom, the bride, and the godmother of the bride. The rest of the places on both sides and at the foot of the table are occupied by the heads of the families attending the feast. It should be noted that this godfather of the groom and this godmother of the bride are not usually the same as the godfather and the godmother arising from the baptismal relationship above described, but are usually persons somewhat older than the contracting parties and act as sponsors for the two, much as do the groomsman and the bridesmaid among civilized peoples.

One of these wedding feasts witnessed in 1908 proceeded as follows: After the usual church invocation, which is always pronounced at any feast, the chief took up the bowl of scrambled eggs above mentioned and personally served a spoonful to each of the four parties most closely concerned with the marriage—first to the groom, next to the bride, then to the groom's godfather, and finally to the bride's godmother. All those at the table were then at liberty to partake of the other foods of the feast. In addition to the abundance of dried meats and other foods with which the table was laden, pottery plates containing a mush made of ripe plantains and meat were served, one to each person. Everyone ate freely, except the bride and groom, who throughout

the morning had remained one in one room and one in another, each specially dressed for the occasion, and each with a cloth carefully bound so as to cover the mouth. The groom was attended by his godfather, the bride by her godmother, and neither conversed with any other persons. The same silence and covering of the mouth were maintained throughout the feast, and indeed throughout the remainder of the day. Toward the end of the feast, one of the officials delivered an extended address in which he exhorted the bride and groom to live peacefully and helpfully together, and outlined the paths each should follow in order to insure model married life for themselves and a useful career to the community. He especially warned the groom that under no circumstances had he any right or privilege in chastising the bride, but that in case she were to become remiss in any of her duties he was bound to report the matter to the chief or to some other official, whose duty it was to see that she was properly punished. Likewise he was warned that remissness on his part would also be met by the officials with severe castigation.

The feast being ended with the usual benediction, and the floor having been cleared, dancing was next in order. Practically all dancing among the Cayapa consists, as is elsewhere described, of a kind of shuffling step back and forth along a line in the middle of the dance floor. A single couple only participate in one of these sets, the man dancing backward, followed by the woman, and vice versa.

A feature of special note in connection with the wedding dance is the order in which the participants came

upon the floor. First, the godfather of the groom, who at the same time is master of ceremonies, danced with the bride; next the groom danced with the godmother of the bride; and finally the chief, followed in order of rank by the other officials, danced with the bride. The groom danced but once during the day, whereas the bride was kept dancing almost constantly. She, however was relieved from time to time by some other member of her family, who danced in her place for a few minutes. During all this time the groom sat at one end of the dance hall with his mouth covered, and conversed with no one except his godfather, and rarely with him. During the intervals between dances the bride sat likewise in silence in an adjoining room. The dancing was kept up during the entire afternoon and night, with a single brief intermission. During this intermission the bride and groom put on new clothing and were decked with pendants and necklaces of silver coins, and with garlands of the yellow flowers so much used by the Cayapa for decorating the images of saints in the church.

After donning this finery, the groom resumed his place at the end of the hall and the bride continued her dancing, which lasted till nearly morning. With the coming of night, light, as usual, was provided in the dance hall by means of candles, small kerosene torches, and native torches (nī'lyū). Throughout the entire period the dance had been the simple one used by the Cayapa, but finally there was danced what is called the "San Juan," a recent importation from the mountain region which appears to be more or less, if not entirely, of Spanish origin.

MUSICAL INSTRUMENTS

In the particular ceremony witnessed on the occasion referred to, at about four o'clock in the morning, four couples danced the "San Juan." The men and the women formed two lines, at the head of which respectively were the groom and the bride; next came the godfather of the groom and the godmother of the bride, while the other couples were those who chanced to be selected for the dance. The music for this is very different from that for the ordinary dance. The marimba was not used at all, and the players of the drums and rattles did not station themselves at the end of the hall near the marimba, but each took his instrument and marched in time to the music up and down and across the hall (pl. CXXVIII). As the musicians and others thus proceeded about the hall, each man exchanged instruments, or hats or other articles of apparel, with whomsoever he met, the latter having no option in this exchange, his duty and privilege being to grasp the instrument or article of apparel from the man whom he next met. Notwithstanding this riot of fun and jollity among the musicians, they played in unison, and the dancers were able to keep their time and step perfectly.

The dance itself proceeded as follows: The two lines, one of men and one of women, danced up to each other and passed to the opposite side of the hall in such manner that each man passed between two women, and vice versa. Having arrived at the wall, they faced about, passed back again, and crossed until this had been done three times and the two lines were left facing each other and in their original positions, one near each side of the room. Next each one of the eight

danced alone and in turn along a serpentine path in and out of the two lines; that is to say, beginning with the bridegroom, who was at the head of the line of men, the dance proceeded as follows: He danced to the opposite side of the room, around back of the first of the women; then to the men's side of the room and around back of the first man; back again to the line of women and around back of the second woman; then to the men's line, and so on until he had completed this dancing across and back, passing each time around one member of the line, and finally had danced up the middle of the hall and had returned to his place. He was followed in the same manner by the woman opposite him, who in turn was followed by the man next in order, and so on, alternating until all the eight performers had danced in this serpentine manner and had returned to their places. Next, the first couple danced in the same manner, the man being closely followed by the woman. When they had returned to their places, the two lines danced across the room and back in the manner first described. Next, the second couple performed this movement and were followed by the dance of the lines across the room and back. The same cycle was repeated in the case of each of the two remaining couples. Finally, the eight dancers joined hands and circled three times to the right and three times to the left, there being meanwhile one drummer within the circle while the remainder of the musicians continued their riotous march up and down the hall. After this, the men led the bridegroom and the women led the bride to their mosquito canopy, which had been put up in

the adjoining room, and placed the two under it. They were followed to the canopy by the musicians and by all the spectators, the former playing their rattles, beating their drums, and whacking sticks most noisily, and all calling and shouting and making every manner of fun. Having been thus escorted to their mosquito canopy, the ceremony was ended, and the bride and groom were at liberty to remove their finery, appear in their usual dress, and go about without further restriction.

The Cayapa maintain that not only at present, under the influence of the Catholic Church, but also in aboriginal times, marriage between near relatives was strictly forbidden. Even marriage between remote cousins is prohibited. This relationship of cousin, however, is regarded in a way somewhat different from that of civilized peoples. Further in case of the death of a man or his wife, the survivor is prohibited from marrying any other member of his or her family.

Divorce is now strictly prohibited, and the Cayapa maintain that it was unknown even before they came under church influence. It is also held that even before the establishment of the church among them the family relations were as sacred and the family ties as binding as at the present time. Divorce, however, is only a theoretical prohibition. As a matter of fact it does occur at the present time, although very rarely. A man or a woman leaving his or her spouse is, if apprehended, severely punished by the Cayapa officials and every effort is made to force reconciliation. Although sometimes these efforts are successful, cases are known

in which, in order to escape the wrath of public opinion and castigation by the officials, offenders against the divorce laws have left the Cayapa country entirely and taken up their abode in Colombia or in the interior of Ecuador. The same applies to the laws relating to marriage between near relatives. The evasion or the open violation of either the laws of divorce or those governing consanguineal marriage are, however, of such rare occurrence that the laws may be said to operate almost perfectly, and they, together with the laws requiring chastity and fidelity in both sexes, certainly produce a salutary moral effect on the community. In fact, it is most exceptional to find a tribe or a community of the size of the Cayapa in which the ethical standards are so high and so strictly observed.

DEATH

As was stated in speaking of medicine practices, death is ordinarily attributed to the presence of malevolent spirits in the body, whither they find their way by various means. For instance, they may be placed by some malicious shaman in the soul of the individual as it wanders about during sleep, or they may enter directly into the body as one passes some particular spot believed to be infested with these malicious, disease-breeding spirits.

There seems to be a difference of opinion as to the soul. One informant maintained that there are numerous souls, each residing in a different part of the body; that the one in the chest is the largest and most im-

portant and the one which ascends to the sky after death, there to receive its proper reward or punishment. This latter notion, however, appears to have been derived from modern religious ideas. The various souls residing in other parts of the body were said by this informant to live in and about the house of the deceased until such time as they are driven out. Most informants, on the other hand, maintain that the body has but a single soul, which lives in and about the house of the deceased until driven out to the ocean or into the mountains by a shaman, there to reside eternally. Having once been thus expelled, the soul is never again seen about the house, but it may return to the cemetery or to other parts of the region. It is said to do no special harm to the living after having been driven away, but will cause the death of other members of the family if allowed to remain unmolested about the house.

On the death of an individual the body is dressed in his best clothing and wrapped carefully in mantas or other available cloth; it is then placed in a wooden box made after the fashion of a coffin, or if the wood is not at hand a kind of coffin is made of bamboo.

If death occurs very early in the morning, the corpse may be interred the same day; usually, however, it is kept until the following day. Meantime the relatives and friends living within comparatively easy reach are notified. All who are able, journey to the cemetery, which is but a short distance from the village, and there a Catholic funeral service is held over the remains, after which they are buried in a shallow grave.

Before leaving the house with the body, the relatives

prepare for the occasion what might be termed a fence of palm-leaves. A row of palm-leaves is set together vertically along the river-bank in front of the house, the row being sometimes a hundred yards or more in length. Opposite the house and at the point where the path ordinarily used for going to the river crosses the row, one leaf is omitted. When the family departs with the corpse, the head of the house sets in place the leaf necessary to complete the fence, and the house then becomes taboo to all passers-by. No one, not even the negroes of the region, would think of going through or around this fence or in any way approaching the house, owing to their fear of the soul of the departed which is supposed to linger about the house and which would be sure to wreak vengeance upon them. If it has been determined, however, that the relatives of the deceased shall again inhabit the house, they return after the funeral and pass through the fence, but not until the head of the house has removed the single palm-leaf referred to as the one last planted by him. The remainder of the fence is never taken down, but is allowed to fall of its own accord.

In many cases such a house is never again occupied. This is true when the deceased is an important member of the family, as the father, mother, or a favorite son or daughter; indeed almost any of the older members of a family are considered sufficiently important to warrant the abandonment of the house. After the death of a young child, on the other hand, a house is almost always reoccupied. The abandonment of a house is a matter of no small importance to a Cayapa family, since its

construction is attended with considerable difficulty, especially in the matter of cutting and adzing the house-posts, which are long and heavy and are made of very hard and durable wood. Furthermore, when a house is abandoned on short notice, other shelter must be found for the family, either by building a temporary structure or by sharing quarters with a relative until a permanent dwelling in a new locality can be constructed. Frequently the move is only a short one; as, for instance, to the opposite side of the river, the fields of plantain and other products being still used. If, on the other hand, the site of the new house is at a considerable distance from that of the abandoned one, new fields and an entirely new equipment are established in a short time. An abandoned house changes very little in appearance for a season, but by the end of a year or two it becomes overgrown with the rank vegetation, and in the course of four or five years is almost entirely invisible. There are instances in which an abandoned house has been sold by the surviving relatives, not to be inhabited where it stood but to be taken apart and the materials transported to a new locality. It rarely or never happens, however, that the surviving relatives themselves will take such a house to pieces and use its materials for the construction of their new home.

In case it has been determined to abandon a house, some maintain that it is never again visited by anyone after the body of the deceased is removed, but others claim that one or more of the surviving relatives return to it with a shaman for the purpose of driving out the soul or spirit of the deceased. As a matter of fact

there would be no other reason for returning to it, since when the corpse is taken away all property which the relatives do not care to abandon completely is removed from the house at the same time.

In large measure the property of the deceased is destroyed or disposed of by the surviving relatives. Some of his property, along with some of their own, is usually buried with the corpse. The greater part of the remainder of the property of the dead, and also frequently much of that of the relatives, is thrown into the river, given to other persons, or sold. Ordinarily one or two articles, as for instance a manta or an adz formerly belonging to the deceased, is kept by near relatives, but often there seems to be a definite desire to destroy all evidences of the life of the deceased and to get rid of any articles that would recall him to their minds.

KINSHIP

The terms of relationship among the Cayapa are as follow:

Ascending Relationship

English	Cayapa	Equivalent
father	a′pa	
mother	a′ma	
grandfather	antc-a′pa	antc-father
grandmother	antc-a′ma	antc-mother
uncle	yapī′pī, apī′pī, apī′kū	a′pī-a′pa
older than parent	apa-karī′we	father-karī′we
	apīkū-rūkū′we	father-kū-old-man
younger than parent	ka′i-apīpī	little-father-pī

uncle's son	apī-na'*t*ala	father-brother
uncle's daughter	apī-na'*t*a-tsu'kkī	father-brother-sister
aunt[16]	mañgō'kō	
older than parent	mañgū'kū-cimbū'we	aunt-old-woman
younger than parent	karī'-mañgūkū	karī-aunt
aunt's son	mañgō-na'*t*ala	aunt-brother
aunt's daughter	mañgō-na*t*a-tsu'kkī	aunt-brother-sister

The terms for each of the corresponding ascending relationships through the father and the mother are identical.

Collateral Relationship

English	Cayapa	Equivalent
brother	na*t*a'la	
elder brother	ūnya'kō	
younger brother	bē'ña	
brother's son	apī'-nya	father-son
brother's son's son	apī'-nya-na	father-son-son
brother's son's daughter	apī-nya-na'ma	father-son-daughter
brother's daughter	apī'-na'ma	father–daughter
brother's daughter's son	apī-na'ma-na	father-daughter-son
brother's daughter's daughter	apī-na'ma-nama	father-daughter-daughter
sister	tsu'kkī	
elder sister	tsu'kkī	

[16] From one informant was obtained the term a'tciū, said to signify both aunt and uncle, and there was also obtained the term *u*ny*u*ny*u*, said to signify aunt. No verification could be obtained for either of these terms, which, combined with the fact that they are so at variance with the whole system of relationship, make them both seem very doubtful.

younger sister	kai-in-tsu'kkī	little-my-sister
sister's son	atcī'-nya	atcī-son
sister's son's son	atcī-nya'-na	atcī-son-son
sister's son's daughter	atcī-nya-na'ma	atcī-son-daughter
sister's daughter	ūpū-na'ma	ūpū-daughter
sister's daughter's son	ūpū-na'ma-na	ūpū-daughter-son
sister's daughter's daughter	ūpū-na'ma-nama	ūpū-daughter-daughter

Descending Relationship

English	Cayapa	Equivalent
child	ka'ilya	
son	na	
elder son	awē'-na	big-son
younger son	ka'i-na	little-son
daughter	na'ma	
elder daughter	awē-na'ma	big-daughter
younger daughter	kai-na'ma	little-daughter
grandchild[17]	pa'nya	
great grandchild	tyū'ī-panya	tyūī-grandchild

Relationship Through Marriage

English	Cayapa	Equivalent
husband	iñ ru'kū	my-old-man
wife [18]	iñ ci'mbū	my-old-woman
father-in-law	antc-a'pa	antc-father

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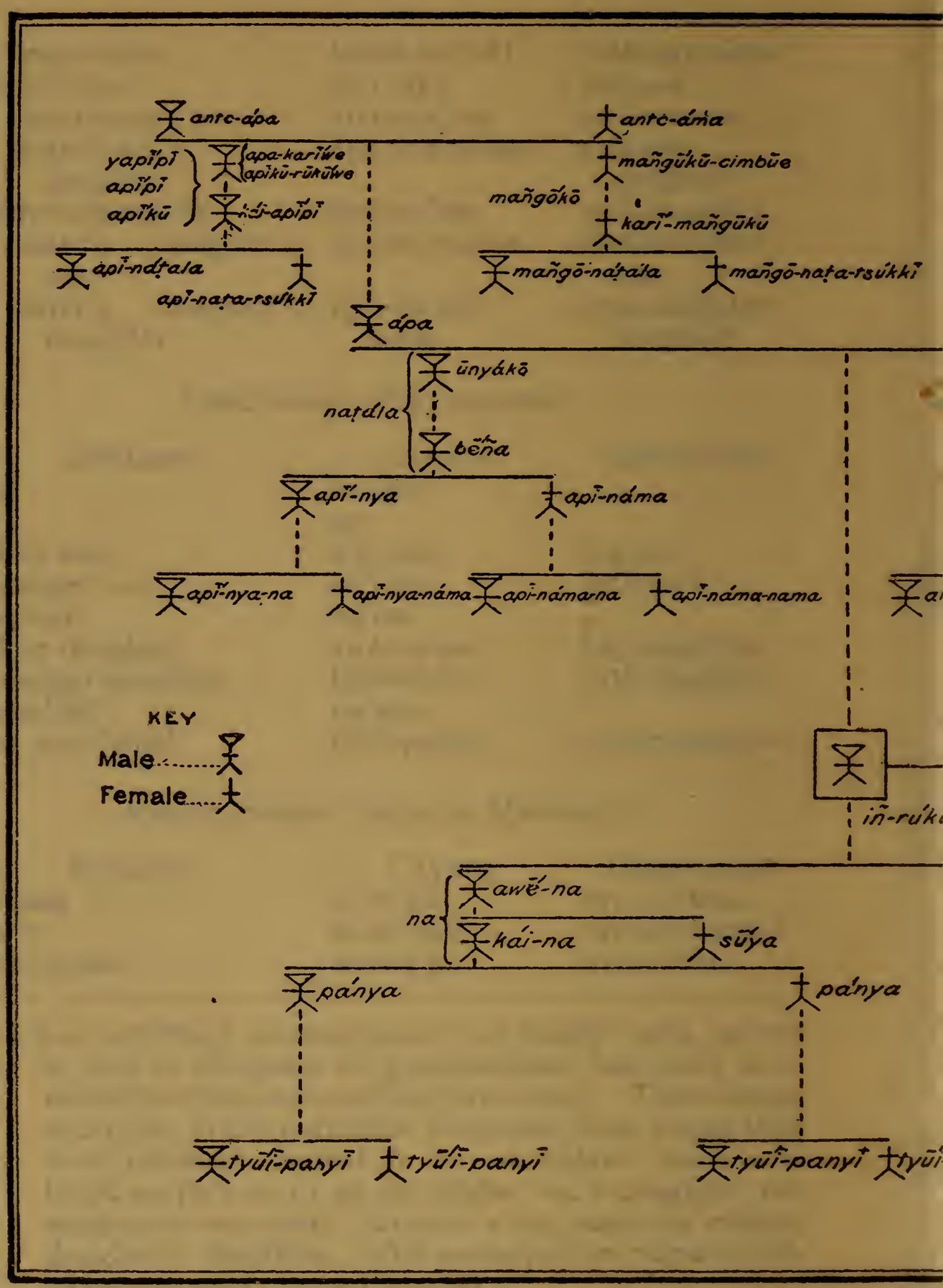
[17] Under ordinary circumstances the simple term pa'nya is used to designate all grandchildren, but there is an indication that more specific terms exist. These terms, according to the particular informant from whom they were obtained, appear to be as follow: son's son, lyūpū-na-pa'nya, or na-na'-mīabe; son's daughter, na-sūpū-nama-na'-mīabe; daughter's son, nama-na'-mīabe; daughter's daughter, sū'pū-nama-pa'nya, nama-sū'pū-nama-na-mīabe, or na-i'ñ-nama.

[18] The term iñ-tsa'kī was also said to signify wife, but the connection appears to be somewhat doubtful.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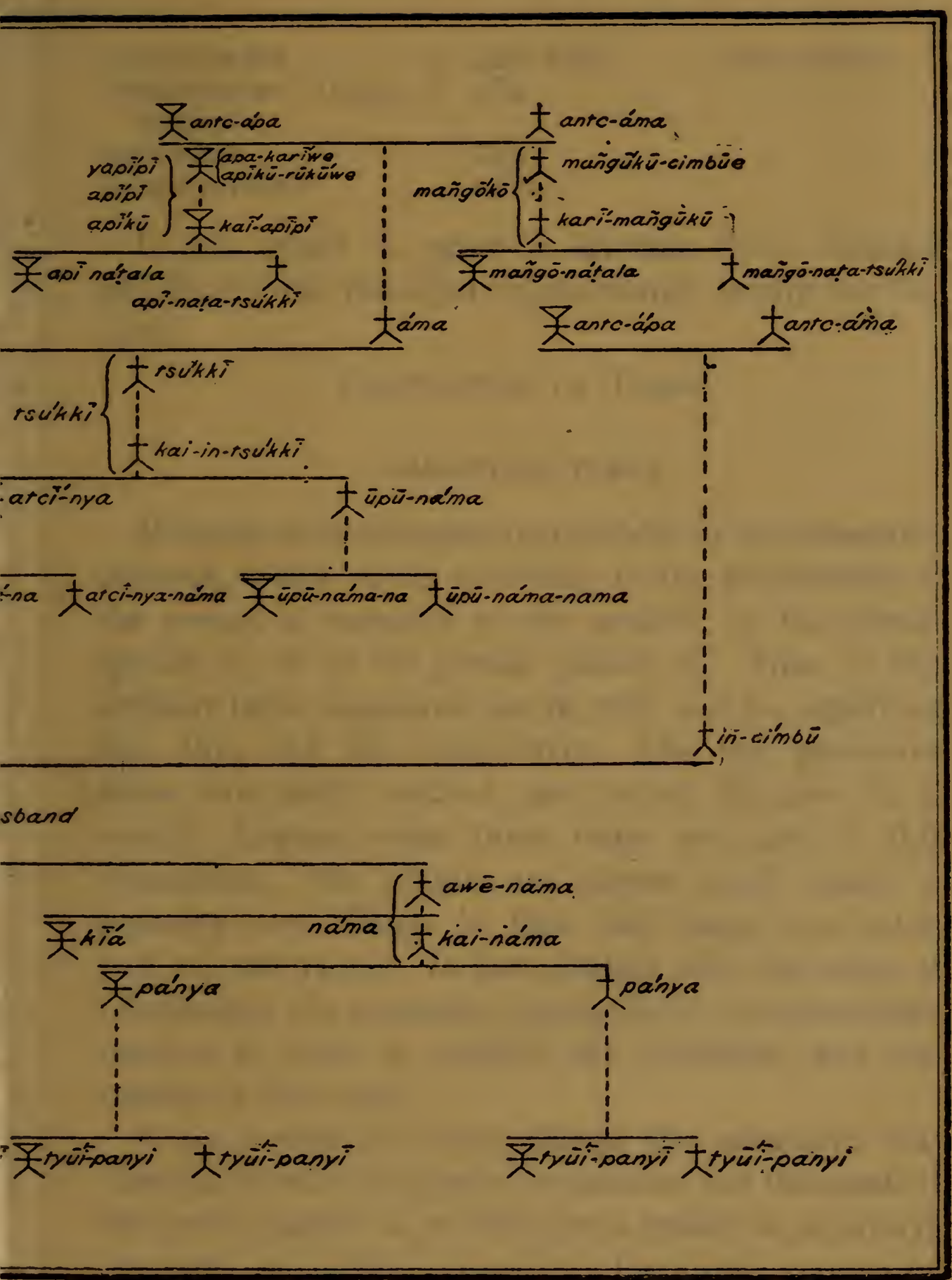
apīkū-rūkū́we
kái-apī́pī
mañgū́kū-cimbūe
mañgṓkō
karī́-mañgūkū
apī-náṭala
apī-naṭa-tsúkkī
mañgō-náṭala
mañgō-naṭa-tsúkkī
ápa
ūnyákō
naṭála
bẽ́ña
apī́-nya
apī-náma
apī́-nya-na
apī-nya-náma
apī-náma-na
apī-náma-nama
KEY
Male
Female
iñ-rúk
awẽ́-na
na
kái-na
sū́ya
pánya
pánya
tyūī-panyī
tyūī-panyī
tyūī-panyī
tyūī

KINSI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maṅgūkū-cimbūe
karī-maṅgūkū
apī náṭala
apī-naṭa-tsúkkī
maṅgō-náṭala
maṅgō-naṭa-tsúkkī
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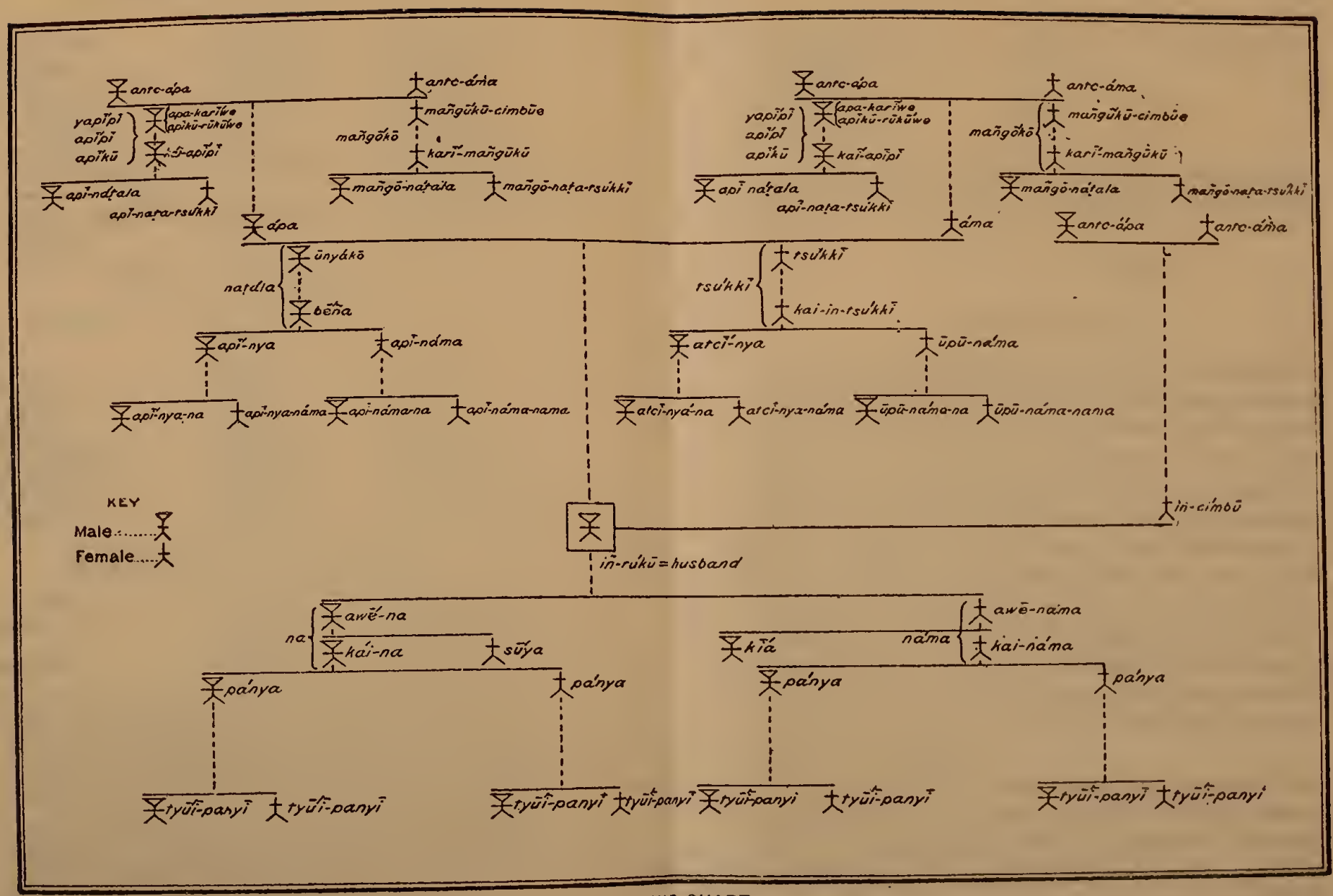
CHART



KEY

Male

Female

KINSHIP CHART

mother-in-law	antc-a'ma	antc-mother
mother-in-law (term of derision)	a'ia	
son-in-law	kī'a	
daughter-in-law	sū'ya	

In pl. CXXIX is given a kinship chart showing graphically the principal relationships among the Cayapa.

Composition of Terms

QUALIFYING TERMS

All terms of relationship are preceded by the possessive pronoun, which varies according to the relationship of the person in question to the speaker, to the person spoken to, or to the person spoken of. Thus, in the singular these possessives are iñ, nyū, and ya, signifying my, thy, and his respectively. The full possessive forms are iñ-tcī, nyū-tcī, and ya-tcī, but the -tcī is usually dropped when these terms are used in this connection. The plurals are almost never heard in ordinary use. These, in their full forms, are la-tcī, nyū-tcī, and ya-tcī. In here dealing with the terms of relationship the possessive pronouns are systematically omitted in order to simplify the tabulation and discussion of the terms.

It is a notable fact that, though this possessive relationship between the person in question and the speaker, the person spoken to, or the person spoken of, is always expressed, no other possessive relationship appears in any of the terms. For example, my sister's daughter's daughter is always preceded by the first person posses-

sive, iñ, to establish clearly the relationship of the speaker to the person spoken of, but within the term itself there appear no possessive elements whatsoever. When literally translated, therefore, the term signifies my-sister-daughter-daughter. All other terms which present analogous combinations of elements have similar forms. The only possible exception to this is the term for younger sister kai-in-tsu'kkī, little-my-sister.

In various terms the words son and daughter appear as qualifying elements, being compounded with other terms of relationship. In many of these cases, however, the terms with which these qualifying elements are combined appear to bear no resemblance to those primary terms indicating the same relationship. For instance, brother's son and brother's daughter are apī'-nya and apī-na'ma respectively, but brother is na*t*a'la. The differences in the case of sister's son and sister's daughter are even more striking. These are atcī'-nya and ūpū-na'ma respectively, while the term sister is tsu'kkī. Thus none of these terms shows on its face even a similar form to that of the corresponding simple term for brother or sister.

The words father and mother also appear in the capacity of qualifiers in the terms antc-a'pa and antc-a'ma, signifying primarily grandfather and grandmother, and secondarily father-in-law and mother-in-law.

Elements indicative of size are used in certain terms, especially those in the descending series, as, elder and younger son, which are awē'-na and ka'i-na respectively, literally big son and little son.

The words old-man and old-woman are elements of

certain terms. Husband and wife are simply my old man and my old woman, iñ ru'kū and iñ ci'mbū respectively. Uncle and aunt elder than the parent through whom the relationship exists are respectively apīkū-rükū'we (also given as apa-karī'we) and mañgū'kū-cimbū'we, signifying uncle old-man and aunt old-woman respectively.

As is frequently the case, the relationships existing between the children of brothers and sisters is conceived to be the same as that of brother and sister. In this case, however, it is not considered as a simple brother and sister relationship, but the term indicates the person through whom it is traced. Thus, uncle's son and aunt's son are apī-na'*t*ala and mañgō-na'*t*ala respectively, signifying literally father-brother and aunt-brother. It seems possible that the first part of this term aunt, which in full is mañgō'kō, may have been derived from mother, a'ma, just as the basal element of the term uncle is clearly derived from father, a'pa. In the case of aunt, however, the term is now so complex, and the term mother, on the other hand, is so simple, that it is difficult to establish clearly this derivation. If such a derivation is assumed, then the term aunt's son is equivalent to mother-ñgō (untranslatable)-brother.

When the terms uncle's daughter and aunt's daughter, however, are considered, it is found that these are formed by the simple addition of the term sister to the terms signifying uncle's son and aunt's son. These are then literally father-brother-sister and mother-ñgō-brother-sister.

MODIFYING CONCEPTS

The sex of the individual spoken of is indicated in all terms except grandchild and great-grandchild. The sex of the person through whom the relationship to the speaker is traced is carefully maintained in the terms of relationship in the collateral line, and there is some evidence that at times terms bearing somewhat of the quality are used in the descending line, though ordinarily the one simple term indicating grandchild is used for all grandchildren and the one term great-grandchild for all great-grandchildren. In the ascending line, on the other hand, no account whatever is taken of the sex of the individual through whom the relationship in question exists. That is to say, all the relatives through the mother are the same as those through the father. In short, this entire phase of the Cayapa kinship system may be summed up in the statement that (1) the respective relatives traced through the father and through the mother are the same, that (2) the respective relatives traced through the brother differ from those traced through the sister, and that (3) all descendants beyond sons and daughters have the same respective designations.

A rather unusual condition is shown in the terms of the collateral line. First of all the three terms brother, elder brother, and younger brother are entirely different each from the other, while the comparable terms for sister show the opposite condition, being formed on the same base. The terms for sister and for elder sister are in fact identical, while that for younger sister

is formed by the simple addition of the term signifying "little."

Proceeding to the terms for brother's children and grandchildren we find them built up on a single basal element, a′pī, which is entirely unrelated to any of the three terms naṯa′la, ūnya′kō, and bē′na, signifying brother. It is evidently related to the term uncle, the root of which is a′pī, which in turn appears to be the phonetically altered a′pa, father.

A different condition, however, is found when the analogous relationships through the sister are considered, for here enters what may be regarded as a double sex feature. Sister's son and sister's son's son and daughter are formed on the basal element a′tcī, with the addition respectively of the terms signifying son, son-son, and son-daughter. However, when the term sister's daughter and the terms for her two children are reached, it is found that they are formed on an entirely new basal term, ū′pū, which fact may be considered as indicative of a double sex distinction in the basal term. That is to say, while in the first instance the basal element a′tci is evidently employed with the signification of daughter of the sister of the speaker, it may be employed only when the following elements with which it is combined are those relating to the son of this daughter. If, on the other hand, it is desired to mention in these following elements the daughter of this daughter, a different basal term, ū′pū, is employed. Furthermore, there is no apparent connection between either of these two basal elements and the term tsu′kkī, indicating

sister. It therefore seems fair to assume that these features of sex which appear in the elements that follow the basal element in these terms may perhaps react on this basal element itself in such manner as to alter it. However, it must be borne in mind that a similar condition does not obtain in the analogous terms that indicate the descendants of the brother of the speaker. Here the basal element is the same in all terms indicating these descendants, though it differs entirely from the three terms for brother.

There are two modes of indicating relative age—one is by the use of augmentatives and diminutives, the other by the use of terms signifying "old-man" and "old-woman." The latter are used in only two terms each. Old-man appears as a part of the term signifying uncle older than parent, apīkū-rūkū'we (also given as apa-karī'we), and in the term husband, iñ ru'kū, signifying literally my old-man. Old-woman likewise appears in the corresponding two terms, aunt older than parent, mañgū'kū cimbū'we, and in the term wife, iñ ci'mbū, literally my old-woman. In only one instance are terms entirely different from the basal one used to indicate relative age. This is in the case of brother, which is na*t*a'la, while elder brother is ūnya'kô and younger brother is bē'ña.

The augmentative a'wē, meaning big, is used to indicate elder in only two terms, those for son and daughter. The diminutive ka'i, meaning small, is used to indicate younger in the terms for son, daughter, sister, uncle, and possibly aunt.

The various terms of relationship in which the element of age enters are as follow:

English	Cayapa
brother	na*l*a'la
elder brother	ūnya'kō
younger brother	bē'ña
sister	tsu'kkī
elder sister	tsu'kkī
younger sister	kai-in-tsu'kkī
uncle	yapī'pī, apī'pī, apī'kū
older than parent	apa-karī'we
	apīkū-rūkū'we
younger than parent	ka'i-apīpī
aunt	mañgō'kō
older than parent	mañgū'kū cimbū'we
younger than parent	karī'-mañgūkū
son	na
elder son	awē'-na
younger son	ka'i-na
daughter	na'ma
elder daughter	awē-na'ma
younger daughter	kai-na'ma

In all cases the terms of relationship employed by the women are the same as those used by the men.

From the table of analyses of the terms of relationship it will be seen that in most respects these terms among the Cayapa are fairly simple. They comprise a limited series of fundamental terms on which as bases the rest are built up by combination with qualifying elements bearing certain definite relations to these basal elements. The two important concepts which enter into these qualifying terms are sex and age, of which the latter is the more important.

MEDICINE PRACTICES. SHAMANISM

Among the Cayapa practically all illness is attributed to the presence of malevolent spirits. In large measure the particular spirits which cause illness reside in small, black, water-worn stones, in fragments of ancient pottery, in mammals, snakes, insects, and the like.

By the entering of one of these spirits into the body of an individual, and especially, as is usually the case, if one of the mentioned objects which is the special abode of this spirit enters also, a serious and often fatal illness results. This illness may take the form of any one of the numerous diseases common to the tropics.

There are various ways in which one of these spirits may enter the body. It may, for instance, enter directly into the body itself as the individual is passing the abode of the spirit, or it may enter the soul of the person which, while he sleeps, is traveling about the earth. In the latter case the spirit, on the return of the individual's soul, is taken into the body and the same symptoms and illness result as when it enters directly without the medium of the soul.

In almost every case a cure may be effected, provided a competent shaman is called in time. Each shaman has his own method of treatment, but in general these methods are similar and consist of (1) whistling and singing to call certain guardian spirits to the shaman's aid; (2) when these spirits have been summoned, the affected part of the body is sprayed with a decoction of rum and bejuco, and is massaged and rubbed with the hands or is sucked with the lips in order to draw through

the skin the stone or other object which, by traveling through the body, together with the spirit which resides in it, causes the illness.

Shamans or doctors form, to a certain extent at least, a special class by themselves, but, so far as could be ascertained, they have no secret or special organization. They are not, on the other hand, "predestined" or specially selected by natural temperament. Any one may become a shaman if he so wishes by simply training under the guidance and instruction of one or more old shamans of recognized ability. For this training he pays a stipulated sum, and is instructed every night until he has learned thoroughly the songs and incantations and the various rituals of his instructor, and also has become more or less familiar with the special spirits which his instructor invokes. He does not, however, rely solely on the spirits of his instructor, but sooner or later acquires others of his own. Likewise, he may devise new songs and incantations.

Not only has the shaman to cure by expelling the spirits from the body of a patient, but he has the more important function of expelling spirits from a locality or from a particular house infested with those which cause illness. This expulsion of spirits from a locality or a house is usually accomplished by several persons under the direction of a head shaman. A decoction of rum and bejuco is almost always used by the shaman himself in this exorcism; the other participants are provided with a kind of decoction made by soaking a species of native mint in water. A large number of cigars are also provided, and it is the blowing of the tobacco smoke,

along with the spraying of the decoctions from the mouth, that makes the particular locality or house untenable for the spirits. The shaman intersperses his blowing and spraying with incantations and with low whistling. He also carries a special lance-shape wand which he waves constantly with a forward motion.

In one instance in which the spirits were to be expelled from a house, the procedure was as follows: The party commenced at one end of the main floor and went slowly toward the opposite end. As they proceeded, each person thoroughly sprayed the floor in front of him and blew clouds of smoke into the air before him. Also every basket, bench, and pottery vessel, and every nook and corner wherein a spirit might be hiding, was thoroughly sprayed and smoked. The main floor being finished, the loft was treated in a similar manner. Next the party descended to the ground under the house, where everything was thoroughly sprayed, even to the pigs and chickens in their pens and coops. Finally, to be sure that the spirits had been completely expelled, the party proceeded, with its spraying and incantations, into the adjoining clearing, and even for a short distance into the jungle.

Such a ceremony is not an especially solemn occasion. In fact the participants laugh and talk throughout, much as if they were engaged in any daily pursuit. This expulsion of spirits is resorted to when several members of a family have been stricken with the same disease. For instance, in case several members have been attacked in succession with fever, one or more shamans are summoned and the spirits which are believed

to be resident in the house or in the surrounding ground are expelled in the manner described.

Similarly after death, since the soul of the departed is believed to return to the house and may cause illness or even death of other members of the family, shamans are called in and the particular soul expelled.

Such a soul is not simply driven into the jungle, but ordinarily is driven into the ocean. It goes to one of two places: to the island of Gorgona off the southern coast of Colombia, or to a large mythical sandbar far out at sea. Sometimes souls are driven only down to the sand beaches along the ocean near the mouth of the river, or in some instances to some secluded and lonely spot far in the mountains. In any event the services of one or more shamans must be enlisted within a month or so after the death of a person in order that his returning soul shall not bring illness and perhaps death to any of the surviving members of the household.

In speaking of souls and spirits it must be borne in mind that as these two terms are here used they are not identical in Cayapa conception. Every animate being has a soul or shade which is a definite part of itself and without which life is impossible. This soul lives on after death. It has the form of the body it occupies, and has the power of leaving the body and wandering about when the body sleeps or is otherwise unconscious, and in this particular resembles a spirit. A true spirit, on the other hand, is a supernatural entity which resides in an object, animate or inanimate, or in a particular spot, but which has nothing to do with the existence of that object. It may take the form of the object it inhabits, especially if the object is animate; but fre-

quently it has the form of a dwarf or even of a normal human being, especially if its abode is an inanimate object. These spirits may leave their abodes and travel at will, or they may take their abodes wish them. They have great magic powers, both for good and for evil.

In addition to the benevolent offices of the shaman, he may exercise a malevolent function by calling spirits to his assistance for the purpose of killing or otherwise doing harm to his enemies. The spirits which he uses for this evil purpose may be those which he uses for good in other cases—they may aid him in killing an enemy at one time and in curing a friend at another.

The abodes of spirits are numberless. They may live within almost any smooth water-worn stone, especially a black or a red one; they are always resident in prehistoric potsherds, especially those of human or animal form; and abide also in almost any object of stone or other hard material of unusual form, particularly if it is smooth. Many mountains and hills contain spirits, both within them and on their slopes and summits. Also nearly every mammal, bird, reptile, and insect is the abode of a spirit entirely distinct from its soul or shade. It is these many spirits residing in both animate and inanimate objects that are the media by which shamans work their magic for both good and evil. A spirit is sometimes called forth from its abode to serve the shaman while thus separated from the object in which it dwells; but it may equally well serve him while in its abode, in which event the object in which the spirit abides accompanies it on its mission.

Furthermore, treatment by magic is almost the only

remedy known to the Cayapa, and implicit confidence is reposed in the shaman with his conniving spirits. It may be said that almost without exception no herb remedies are taken internally, and very few are applied externally.

For cuts or serious bruises where it is obvious to the Cayapa mind that spirits are not at fault, the wound is generally sealed with brea, the wax of a small bee. This is applied while hot, and appears to have a genuine medicinal value, since it tends to sterilize the affected spot and reduce the probability of infection, so deadly in tropical countries. Similarly a piece of green leaf may be placed over a cut or bruise or over a running sore to protect it from the air, and especially from annoying and dangerous insects. This treatment is used especially for the ulcers which result from the bite of a small mosquito found in large numbers in this part of the tropics. Almost any kind of a leaf serves this purpose, and the treatment has of itself no aseptic virtue.

For anything more serious than a cut, bruise, or ulcer, no treatment is used other than bathing the wound occasionally and perhaps bandaging it, since such cases are considered too serious to yield to treatment. This is especially true of an ailment caused by something of foreign origin, as a gunshot wound, which, being due to an instrument of which the Cayapa have no aboriginal knowledge, cannot be cured by a shaman. If, on the other hand, a wound of this kind results in complications, such as increased temperature, a shaman is summoned to treat it for the reason that the affection is obviously due to the presence of malevolent spirits; but the Indians

maintain that a shaman never attempts to cure the wound itself. A case of this kind observed in 1909 was that of a young man who had been accidentally shot at close range. There were seven buckshot holes through the calf of the leg, and each formed an ugly gangrenous wound. When first seen seven days had elapsed since he had received the wounds, but no treatment, magic or otherwise, had been given other than the bathing and bandaging above mentioned.

A shaman's paraphernalia consists almost invariably of three classes of objects. First, one or more small lance-shape wands of black wood, each possessing special magic power from the spirit or spirits residing therein; second, a bottle of a decoction of rum and bejuco; third, a number of smooth black stones, potsherds, and similar objects of unusual forms. Especially valued are the ancient stone axes, either whole or fragmentary, which are found now and then about old village-sites and mounds or along the banks of streams. These objects, as before stated, are all supposed to be inhabited by spirits. One may be the abode of only a single spirit, while another may contain as many as ten or a dozen. One stone ax, for example, in possession of a shaman near Punta Venado, was said to contain five spirits. When an attempt was made to purchase this ax from him, he was greatly in doubt whether it would be wise and proper for him to part with it. To settle the matter he sprayed the stone with the decoction of bejuco and rum, and sang and whistled to it for a considerable time, meanwhile gazing at it intently. At last he pointed out the exact positions

of the five spirits which the stone harbored, and explained how each was angry at him because he had even thought of disposing of the stone. He of course refused to sell it, stating that it would be of no use to the purchaser for the reason that if the spirits were not willing that it be sold they would return, together with the stone, on the following night, to the basket in which he kept it, and that the purchaser would lose the price paid for it, since it would be impossible for him ever to keep the stone, no matter in how strong a receptacle it might be put, because the spirits were able to take it at will wherever they liked.

While these stones and other objects used by shamans in their practices are so highly prized and so carefully handled by them, little care is taken to guard such objects from contact with other persons. Ordinarily they are kept in an open basket upon the floor and within the reach of uninitiated adults as well as of children. There seems to be no fear that the mere handling of these objects will cause any ill effect on the uninitiated—it is only when such a person attempts to use one of them for the purpose of doctoring that there is danger.

As above indicated, objects containing spirits may be bartered among the shamans whenever the spirits themselves are willing, and they are sometimes sold without consulting the spirits; but if it is a particularly valuable object and the abode of several spirits, these are always consulted before it is disposed of.

Although there are several shamans in the three divisions of the Cayapa, shamanism is comparatively little practised, and the position of a shaman in the tribe

is not a very important one, The Cholo of the southern part of Colombia, on the other hand, are noted, at least among the Cayapa, for their knowledge of magic. In fact there are no fewer than five or six Cholo shamans who live constantly on the Rio Cayapas, and it is to these that the Cayapa often apply when in need of shamanistic services. The negroes of the region also have their shamans, who are often summoned by the Cayapa, particularly for the purpose of treating the sick. For the expulsion of spirits from a locality or from a house, however, the Cayapa rely almost entirely on either their own shamans or those of the Cholo.

RELIGION

The Universe

There is a gigantic being, called Tyapatcī tena′tū, who supports the lower world upon the palm of his hand. Upon the lower world, called ta′ñca, which means literally "within," is mounted a great pillar of gold and silver that holds up the middle world upon which we live. Upon this middle world there rests another pillar of gold and silver which supports the upper world, called ka′ica, above which there is nothing. The lower world is inhabited by the pehūrū pu′tyū; the middle world is inhabited by human beings and the various spirits, and the upper world is the abode of a still different people, ideas concerning which are not very clear.

In the lower world conditions are in every way the reverse of those in this world. There, for instance, the

sun and the moon travel from west to east, they being the same orbs, however, which illumine our world.

The sun and the moon, pa''ta and pō pa''ta, are two men whose eyes are their source of light. Formerly they both gave the same amount of illumination, but owing to this fact night was, in ancient times, as bright as day, and the inhabitants of the earth were able to hunt at all hours. They thus menaced the existence of all animal life, a fact which, when the Creator saw it, caused him to alter conditions by covering up one of moon's eyes, so that now the moon gives only half as much light as the sun.

Near the eastern margin of our world there is a large hole through which the sun comes up from the underworld in the morning. He then walks up a trail in the sky, shedding as he goes the light of day upon the earth. By some this is referred to as "walking up the big mountain of the sky." As elsewhere noted, it is supposed that at this eastern margin of the world there lives a race of pigmies called pa'ʟa'mbele, whose diminutive size is due to the great heat of the sun, which is so near them as it emerges from the lower world.

At the zenith there is a chair in which the sun takes a brief rest at noon. Here he eats a small lunch consisting of cornmeal mush and boiled grouse-eggs, after which he continues along the trail down the western slope of the sky until evening, when he reaches another opening near the western margin of the earth through which he disappears into the underworld to furnish it with light. His only companion during these endless journeys is a white dog. He himself is dressed in pure white, his

clothing being made after the fashion of the shirt and trunks commonly worn by Cayapa men.

The moon travels the same trail and in exactly the same manner as does the sun, stopping at the zenith to rest and eat. He is in every way the equal of the sun, except that he is unable to give so much light and is entirely alone, not even having a dog as a companion. His clothing also is pure white and is the same as that of the sun. Being in ordinary human form, neither the sun nor the moon is able to fly, but they keep up their journeys along this endless trail year in and year out with no halt save those short stops at the zeniths of our world and the underworld.

No accounts of eclipses of either the sun or the moon could be obtained, and no theories concerning the phases of the moon were advanced. In fact, other than the foregoing meager mythical account of the sun and the moon, no information whatsoever was obtainable from the Cayapa respecting either of these celestial bodies. Furthermore, no particular information was obtainable in regard to any of the individual stars or any of the constellations. The almost total absence of star-lore and of acquaintance with the heavenly bodies may possibly be accounted for by the fact, already noted in referring to the climate of the region, that the sky is almost continuously overcast, the clouds hiding from view almost constantly all the heavenly bodies. To be sure the Cayapa formerly lived in the interior where these conditions do not prevail to such an extent, but they have lived in their present environment for several generations and have had ample time to lose much of any system of star-lore that they may have possessed originally.

SETTLEMENTS OF WHITES AND NEGROES ALONG THE RIO CAYAPAS

HACIENDA OF A NEGRO IN A GROVE OF COCONUT PALMS

The three worlds of the Cayapa are each flat, approximately square, and of about equal size. A short distance beyond the openings through which the sun and moon emerge and depart from it, are the eastern and western edges of our middle world. There are also a northern and a southern edge to the world. Beyond these edges there is nothing.

The upper world, ka'ica, is similar to our middle world, but it lacks rivers, the sea, and indeed any body of water. Furthermore, it never rains there. It is illuminated constantly by another sun, which is stationary. Ideas concerning the inhabitants of the upper world are not very clear. It is known that they have houses, but these are of a different form from the Cayapa dwellings, being described as somewhat like the houses built by the white people in the settlements at the mouth of the Rio Cayapas, which means that they are not set high upon piles and that they have sides (pl. CXXX-CXXXI). By some it is claimed that the souls of departed human beings reside in this upper world, but most say that they reside at certain out-of-the-way places on the earth. It is said that this upper world is inhabited by spirits, but their exact nature is not clearly understood.

Creation

The Cayapa appear to have no native account of the creation of the universe, at least all attempts to obtain such were futile, and there appears to be only a remnant of an account of the creation of human beings, and this is more or less mixed with introduced religious con-

ceptions, if indeed it is not entirely a distortion of the biblical account of the genesis. According to this, God (Dios apa) fashioned out of clay five pairs of individuals in the form of human beings, at a point far in the mountains east of Quito; he then spat in their mouths and they sprang up in the full vigor of life. They went immediately to the region of Ibarra and became the first Cayapa. No details are given of their further existence up to the coming of the Spaniards. It is said that at that time they had so far increased as to fill the country completely. This account further states that, owing to their fear of the Spaniards, and especially of horses, they migrated to Pueblo Viejo in the lower mountains between Ibarra and the coast at a time shortly after the arrival of the first Spaniards. According to other accounts it would appear that this migration was probably prior to the conquest and may have been due to the encroachment of other tribes. It seems not improbable that the active conquest by the Quichua of Peru, which extended throughout the interior mountain region of Ecuador at a time immediately prior to the Spanish conquest, may have been the cause of this migration. Other than this meager account, the aboriginality of which is doubtful, it was impossible to obtain a trace of a creation myth accounting for the presence of human beings on the earth.

As for the universe itself, it seems to be accepted by the Cayapa as having always existed and as having required no act of special creation.

The Soul

The soul, called kū′mī, inhabits every human body as well as the bodies of certain other animate beings. In general it has the form of the body that it inhabits, and has the power of leaving the body during sleep and of traveling about at will. In their travels the souls visit many places, such as cemeteries, houses of friends, etc., and are subject to considerable danger while thus wandering about. A shaman with malicious intent may by his magic summon one of these wandering souls and, by appearing friendly, may gain its confidence sufficiently to induce it to drink chicha, thus partially intoxicating it and enabling him to insert within it a pebble, a snake, an insect, or some other object which will work ill. On returning to its body, the soul takes with it this malevolent object, which also enters the body. As a result, illness follows almost immediately and the person dies within a short time, usually at or just before sunset, unless properly and promptly doctored by a shaman. Such illness is said to resemble an attack due to a natural cause, which is to say that it resembles an attack caused by the entrance of similar objects into the body by means other than through the agency of the soul; for it must be remembered that all illness other than that resulting from wounds, bruises, or other visible external means, is attributed to the presence of one or more of these magic objects in the body. It is said that fevers, for instance, which result from the presence in the body of these malevolent objects brought to it by means of the soul, cannot be distinguished in

their symptoms from fevers resulting from drinking water in a new region. This alludes to the fact that in this region it almost invariably happens, even with people in perfect health, that if they travel from the coast into the interior mountains, or vice versa, they become ill for a short time with a fever of greater or lesser gravity. This is attributed directly to the change of drinking water, though in the Cayapa mind there is here also a direct connection with spirits.

A still greater danger to the soul as it travels about during sleep arises when a shaman sets a trap or a deadfall at any point he thinks a soul is likely to pass. If the soul gets into this trap or deadfall, it is killed, so to speak, and its owner never awakens. The soul itself, being immortal, later escapes from the trap or deadfall and passes on with its future existence, but once the life has left the body which it formerly inhabited, the soul is never able to return to it.

After death, souls travel about as they do in sleep, frequenting for a time special burial places and the homes which their bodies formerly inhabited. They would, if unmolested, continue indefinitely to go about their former haunts, but, owing to the danger to the living from their presence, means are taken to expel them. The expulsion of these souls, as also of malevolent spirits, by one or more shamans has been described in detail in speaking of medicine practices.

By many it is claimed that certain mammals, birds, reptiles, and other animate objects do not possess souls, but by others it is claimed that every animate object has a soul. Inanimate objects, such as waterworn

pebbles, fragments of ancient pottery, ancient stone implements, and practically all hard objects of unusual form, are the abodes of spirits, but have not souls like those of animate objects. The souls of other animate objects may travel about during sleep and unconsciousness, just as do the souls of human beings. The spirits resident in inanimate objects, which of course do not sleep, travel only at night. As a matter of fact the souls of animate objects also travel almost exclusively at night, since, with but few exceptions, these animals sleep at that time. The souls of animate objects and the spirits resident in inanimate objects seem to be endowed with about the same attributes, and they mingle on friendly terms, assembling in various places to dance together, visiting burial places together, and in general making common cause in their wanderings and associations.

What seems to be an intrusive idea from Catholic sources is that human souls ascend at death to the upper world, but ideas concerning this abode and the ascension of souls are largely indefinite. However, it is maintained by some who hold rather vaguely to these concepts that God keeps there a long ladder which, when the person is about to die, he drops down in order that the soul may ascend. But the majority of the Cayapa, and even those who claim to believe in this ascent to the upper world, avoid burial places at night and have the souls of departed friends and relatives expelled by shamans from their houses and driven out to the ocean in the old orthodox Cayapa manner.

Spirits

In addition to human beings and other animate creatures, the world is peopled by a myriad of spirits of many kinds. As has been already indicated, these spirits live in or upon mountains, at certain places in streams, in stones, in fragments of ancient pottery, and in every sort of object of unusual form. Many are benevolent spirits, while others are always malevolent, and still others may be both malevolent or benevolent as occasion demands. Some classes of spirits are entirely male, others entirely female, while in still others are found men, women, and children, and full family relations. Some are giants, some dwarfs, and many are of ordinary human size. Most are in human form, though the bodies of some are deformed or are lacking some particular parts or organs. Many of these spirits dress as do the Cayapa, though others have special forms of dress, and still others no dress at all. Spirits are of various colors also, though the greater number are of the same color as well as of the same bodily form as the Cayapa. In large measure they move about only at night.

THUNDER

One of the most important of the spirits recognized by the Cayapa is Thunder, kū′īdya. According to some informants the Thunders are two, a male and a female; they somewhat exceed in size the average spirits, and have light-blue bodies covered with coarse hair somewhat like hog-bristles. The thunder spirits wear no clothing

and do not paint their bodies; they have large blue wings with which they fly from place to place, and the flapping of which causes the detonation we call thunder. They have no special abode, but frequent certain places more than others: especially do they frequent a particular high hill far up the Rio Cayapas.

Other informants differ in some particulars in their description of Thunder. By them it is said that he has no wings and does not fly, but that he and his wife sit constantly on top of a large tree on a high hill far away in the mountains. They are giants, with very massive backs, and are very strong. They have very long finger-nails, which are hard like rocks; these they shed from time to time and when found they are much prized by shamans for curing disease. Instead of having bluish bodies covered with bristles, the Thunders wear the ordinary attire of the Cayapa, but of a blue color. In addition they both wear blue caps, and both have long hair on their arms. When in a bad temper, Thunder talks loudly and growls, thus making the thundering noise. His bad disposition is especially manifest in the rainy season, while at other periods he is mild-tempered, growling only occasionally. Thunder's wife never has anything to say. It is said that up to about a generation ago the Thunders lived toward the lower course of the Rio Cayapas, but that in recent years they moved into a very remote part of the mountains and that thunder is consequently less frequently heard now in the Cayapa country.

LIGHTNING

Lightning, kū′ĭdya pĭdya, which almost all peoples seem to recognize in one way or another as directly connected with thunder, is attributed by the Cayapa to the sword-like weapon carried by the Thunder spirit. As they describe this weapon at the present time, it is obvious that modern ideas have intruded, although it seems probable that the concept of lightning coming from an implement carried by the Thunder being is aboriginal. The sword is said to be of steel and to be carried in a scabbard; it is highly polished, so that when it is unsheathed the glint of the sunlight upon it is like the reflection from a mirror. It is maintained by some that Thunder strikes and kills people with this sword, or at any rate with the glint of light from it.

It is said that in the dry season Thunder is quite contented and lives at peace with the world. In the rainy season, however, he becomes restless and very much discontented with human beings and with conditions generally, and it is then that, according to the first informant mentioned, he flies from place to place through the clouds, flapping his wings and making an uproarious noise, swinging his sword and causing the flashes of lightning. In due time, however, his wrath subsides and he becomes weary, and during the remainder of the year he grows restless only occasionally, with the result that thunderstorms rarely occur and lightning is seldom seen.

CAVE SPIRITS

Another important class of spirits are the bū''tcūlya, or *t*ūnda, called also by the Spanish name malava. These spirits are very numerous, and live, each family by itself, in what may be termed hollow mountains, that is to say, mountains containing enormous caves (a tū'hūrū), with numerous chambers, each illuminated by means of a sande-sap torch. Within such a mountain the house arrangement is much like that of a Cayapa dwelling, except that it is not elevated upon house-posts and of course has no thatch. It also has no storage loft, and its floor is simply the dirt or stone floor of the cavern. Access to it is by means of a tunnel entrance in the side of the mountain, never through a shaft on the summit. The entrance is covered by a very large mat and is not visible to human beings. Here the parent bū''tcūlya lives with his family in exactly the same manner as would a Cayapa. He also has domestic animals and birds as have the Cayapa. His "dogs" are the jaguar, ocelot, and puma. He also keeps as pets the wild-hog, the peccary, the two large species of rodent called in Spanish guatin and guanta respectively, and various smaller mammals. His "chickens" are the two species of wild turkey, the grouse, and the doves of the various species common to the region. All these mammals and birds living in the cave of bū''tcūlya are the same as those which run wild in the mountains, except that they grow to immense size and are always very fat. Also all the wild birds and mammals of the jungle are the pets of the bū''tcūlya and are under his special protection.

He always has stored large quantities of the eggs of these birds, especially those of the large species of grouse known locally as perdiz. The house furnishings are similar to those of the Cayapa, except that the coiled equis, a very poisonous snake, is ordinarily used for a bench or seat, while the coiled boa is used as a receptacle for serving food.

In personal appearance the bū''tcūlya is similar to the Cayapa, except in color. By some he is said to be whiter and of a more reddish cast than the Cayapa, but by most his face is said to be bright yellow, for the reason that he paints it all over with yellow achote. It is claimed that the rest of the body is not painted. The women bū''tcūlya are said to be very beautiful and to have long flowing hair. By some it is claimed that the bū''tcūlya have bodies of normal form, but by most informants they are said to have no buttocks or anus, and hence are unable to defecate. For this reason they never eat, but gain sustenance from the water they drink, and especially from the steam and aroma arising from boiling meat and other foods. Although unable to defecate, they can urinate and hence are able to drink water and inhale steam. Their genital organs are perfect, but they are incapable of sexual intercourse except in bright moonlight.

In ancient times the bū''tcūlya were much feared by the Cayapa because the sight of one of them would bring illness and ultimate death, and also because they would steal children and even adults. In more recent times, however, it is claimed that they do not steal people, but confine their depredation to dogs, pigs, and chickens, and the vegetal foods raised by the Cayapa.

They go about inhabited places always at night, and although ordinarily they are invisible to the human eye, their presence is known by their blubbering speech, although they can speak intelligibly if they so desire.

That, to the Cayapa mind, the bū''tcūlya still exist and that they are much feared is shown by the following incident. While the guest of one of the Cayapa officials it was the author's custom sometimes to sit for hours in the evening conversing with him on various phases of Cayapa life. On one of these occasions, on a pitch-dark night, we were talking merely of the ordinary pursuits of the people. A lighted torch had been placed between us, which precluded the probability of the informant being able to see into the darkness outside the house. Suddenly, in the midst of our conversation, he sprang to his feet, ran over and untied the dog, and sent him down the ladder, while he himself ran to the railing at the side of the house, meanwhile urging the dog on in pursuit of something out in the darkness. He later explained that he had heard the blubbering speech of a bū''tcūlya near the house; he had seen nothing of the spirit and knew of its presence only by the sounds it made, but had hastened to drive it away to keep it from stealing his pigs and chickens which were confined under the house.

These spirits are believed to travel during the day as well as at night, and in case a house is left without occupants they frequently visit it and either carry away the food stored in it or cook it on the spot for the purpose of inhaling the steam and aroma which arise therefrom.

Although it is maintained that the bū''tcūlya do not

carry people away bodily at the present time, they nevertheless entice them to their caves, but this is said to be done out of a spirit of sociability and not with the desire of doing them bodily violence, though there is considerable danger attached to a visit to such a cave. These spirits, though ordinarily invisible, have the power to make themselves visible to human beings at will and when a person is off in the jungle, or in any lonely place, he is likely to be visited by a bū''tcūlya and invited to return with the spirit to his cave. If he goes and enters only the outer chamber of the cave, he can return, but if he is enticed into the inner chambers, escape is impossible, for these are guarded by vicious jaguars and pumas. On entering an outer chamber a guest usually is invited to sit upon a bench consisting of a coiled equis, and is offered food upon plates made of coiled boas. Stories are told of people who, on falling asleep or becoming intoxicated in some lonely spot, have been enticed into one of these caves by a bū''tcūlya and have seen and experienced various things in the outer chamber and yet have escaped and returned home. After such an experience a person is likely to become ill, and if not properly doctored by a shaman will ultimately urinate blood and then die. Merely to see and to talk with a bū''tcūlya, however, is not of itself fatal as is the case with some other classes of spirits.

An experience is related by a Cayapa who once had occasion to make a canoe at a place back in the hills and far from his house, so that it was impossible for him to return home every day. He therefore, as is customary, built near his work a small "rancho," or temporary house,

for himself. Upon returning to the hut late one afternoon, he found in the fireplace a fresh fire, which he could not account for; but he was more greatly surprised the next evening to find not only a fresh fire but a potful of cooked food. He therefore determined to spy upon the hut, and accordingly, on the third day, returned early in the afternoon, when he found there a very beautiful yellow-complexioned girl with a large pot of cooked food and with bala prepared for the evening meal. She had been cooking and preparing this food in order that she might inhale the steam and aroma from it. He entered the house and spoke to the girl, but received no answer. He then said to her, "Come, give your husband some food." She gave him the food, but still made no reply to his remarks. Later she left the "rancho" abruptly, saying that she did not wish to marry a man who ate all kinds of food while she was unable to eat anything.

Another Cayapa, out hunting, shot a turkey, and while reloading his gun was suddenly felled by a heavy blow from behind. Some one cried, "Why do you kill my pets?" He looked all about, but could see no one. This also was a bū''tcūlya, which had been angered by the shooting of the turkey, for all wild birds and mammals are the pets of these spirits.

Another old man, who was adzing a canoe near the bank of the river at a point a short distance above the house of the chief at La Herradura, became somewhat intoxicated and feel asleep. A bū''tcūlya came and invited the old man to his home. Accepting the invitation, he soon found himself in the large outer chamber of a cave. Here the bū''tcūlya showed him various mammals

and birds, all very large and fat, which he kept as pets. He then invited the old man to sit upon his bench, which was a coiled equis, but the old man declined. He then offered him a cup of champo, a drink made of corn, the cup being a coiled boa. Again the old man declined. The spirit then invited him to go enter the inner chambers of the cave, but on approaching these the old man found them guarded by jaguars tied at each side of the entrance, which so frightened him that he did not dare to proceed. He had not gone more than about twenty-five feet into the cave, so was enabled later to escape. He sat in the outer chamber for some time, and talked with the bū''tcūlya, who explained his mode of life, how he obtained his food, and various facts concerning himself and this class of spirits, all of which the old man related on returning home. This old man returned the same day; but in the case of another Cayapa who was enticed into a cave of the bū''tcūlya, he was detained for three days, but the spirit was not able to induce him to enter one of the inner chambers. During his entire stay the spirit from time to time offered him foods of various kinds upon plates made of coiled serpents, all of which he refused. At the end of the third day he was permitted to return home, although he was much more dead than alive from the ordeal through which he had passed. The man almost immediately became ill, his body was covered with sores, and in the course of a week he urinated blood and died. After such a protracted visit to the cave of one of these spirits, death is almost certain.

That the mammals and birds kept by the bū''tcūlya spirits in their caves are so large is said to be because

the spirits themselves never eat any of the material part of the great quantities of food which they appropriate and cook; consequently this food is fed to their pets. The food is thrown to them upon the floor, as we might feed an animal, but all food offered to human beings who are guests in the cave is served upon coiled serpents.

While the bū'tcūlya live primarily on the earth, they are able to ascend into the upper world by means of the rainbow (bū'tcūlya ciñgūtiñatū) to visit Thunder. The object of this visit is purely a friendly one, since the bū''tcūlya are not servants of Thunder and neither do favors for nor receive favors from him.

INDIOS BRAVOS

A class of beings which seems to be partly mythical and partly to have a basis in fact are the Indios Bravos, or he ūya'la. As was mentioned in speaking of the history of the Cayapa, it is claimed by them that their occupancy of the country adjacent to the Rio Cayapas dates only from comparatively recent historic times, and that formerly there lived upon the river the Indios Bravos, a people who subsisted, partly at least, on raw human flesh. In other respects these people were much like the Cayapa themselves. They lived in isolated family groups and had no villages; they were a little taller than the Cayapa, but of the same general appearance and color; their clothing, however, consisted of a short skirt of black cloth, which was the dress of both men and women; they used no paint on their faces or bodies; their most striking physical feature was their very large eye

teeth, similar to the fangs of the jaguar. After the Indios Bravos had preyed on the Cayapa for many years, the latter arose against them and descended upon their territory with a strong force armed with magic weapons, almost annihilating the cannibals and taking possession of their country. A detailed account of this trouble between the Cayapa and the Indios Bravos is given on pages 32–36.

It is said that a few Indios Bravos still exist far back in the mountains near the headwaters of the Rio Guayabamba, where, contrary to their ancient custom while on the Rio Cayapas, they have a village. They are never visited by any surrounding peoples, and are much feared by all. In recent years the only definite report of them which has reached the Cayapa is that, while a party of negro rubber gatherers was on the headwaters of the Guayabamba, they came upon three Indio Bravo boys whom they captured after a desperate struggle. Being on their way to Quito, the negroes endeavored to take the boys along. En route two of them died, but the third reached the city and was placed in the care of some priests. One of the Fathers later had a finger bitten off by the boy, thus showing the innate viciousness of the Indio Bravo tribe.

It is said that the Cayapa fought the Indios Bravos with a short palm-wood spear. These weapons are still found occasionally, partly embedded in the sand of the river where they have drifted from ancient times. These implements are said to be so dangerous that if a person attempts to pick one up or touches it in any way, illness is sure to follow. It is probable that this short

palm-wood spear is in reality the magic wand which was used by the Cayapa against the Indios Bravos when they were driven from the Rio Cayapas, as before mentioned. The Cayapa were able to do this by virtue of their superior magic and the superior magic of their wands, and not by means of ordinary conflict, hence it is the magic of these wands or spears which still clings to them that renders them so dangerous even at the present time.

THE GIANT ASLAŪ′HMŪ

A class of male giants said to have been very numerous in former times in the foot-hills bordering the Rio Cayapas is the aslaū′hmū. It is said that these giants became frightened at the first firearms possessed by the Cayapa and that they gradually disappeared into the mountains farther back from the river. Here they still reside, and even yet capture people who venture too far into the jungle. These giants are from eight to twelve feet in height, have skin of the same color as the Cayapa, and have very long fingers without nails. Their noses are very large also, being about three inches in length; their eyes are very large, and the mouth is irregular in shape; they have no teeth, and are unable to talk; the upper part of the abdomen appears normal, but the back from the ribs down is lacking, and within the abdominal cavity the liver is the only organ present. They wear a kind of skirt of bluish cloth, somewhat similar in texture to that woven by the Cayapa, and a bluish shirt reaching to the umbilicus and with sleeves which come to a point just above the elbows; they also wear a tall blue cap

which has no vizor. The aslaū'hmū travel in bands of five or six, or even more, and often attack hunters or others who are alone in the jungle. They carry long whips slung over the shoulders, the lashes of which are provided with thorns, and with these they strike and kill people. As the whip is swung over the shoulder to strike a blow it makes a loud noise like *thrūm-m-m-m-m!* They eat no food whatever, and make no use of the bodies of their victims—the body is simply left where it has fallen and may be easily recognized by the black stripes from the whips with which it has been struck. These spirits are themselves vulnerable, having been killed by hunters with lances, and it is from this fact that the Cayapa are able to give so exact a description of them. While out in lonely places hunters and others must use great care to protect themselves from the windward side, since the aslaū'hmū travel rapidly with the wind and usually attack from that direction. They travel, on the contrary, very slowly against the wind, even though it be no more than a breeze.

ŪRA''TŪ

In a large village in the mountains to the east of Quito reside the ūra''tū, who have no other abode, but are able to travel very swiftly over any part of the world. Here they live in every respect like the Quichua Indians of the mountain region. They have low, thatched houses, without sides and with earthen floors. Every night the floor of one of these houses is thoroughly cleaned and a dance is held, in which most of the ūra''tū participate.

Some dance on their feet, some on their hands, and some on two long fleshy projections like horns or ears which grow on top of the head, but which are quite different from the ears of men. These spirits are about the size of the Cayapa, and live in family groups in their village as do human beings. Their skin is very black, and their hair kinky and bushy. The mothers carry their babies upside down on their backs. The women wear simply a black skirt, while the dress of the men consists of short trousers reaching almost to the knees, and a reddish short-sleeved shirt. In the mountain region nearer to the home of the ūra''tū they are a great menace to the people, since they steal human beings bodily, and merely to see one of them assures illness of some kind and probably death in a short time.

KŪ'ME

Another dangerous class of spirits is the kū'me, who live in the mountains and in deep pools in the river. These are described as being of about the size and general appearance of human beings, but with very black skin. The kū'me always go about with their heads thrown far back, so that they face the sky and are unable to look forward. They travel late in the afternoon and at night, and are in the habit of pursuing people who are out at such times. If a person is caught by one of the spirits, and especially if he is hugged by the spirit or if the spirit's breath touches his body, illness is sure to follow and death is certain unless the patient is properly treated by a shaman. These spirits are entirely invisible

to ordinary human beings, and when they attack a person they remain with him throughout his illness and until death, when they snatch the soul as it is departing from the body and carry it away. They may be seen and driven away, however, by shamans who have drunk of the decoction of rum and bejuco, and who are able to chant the proper incantations.

PĪ''TCŪLYA

Especially dangerous to canoemen are the pī''tcūlya, a class of spirits which live in caves in the bed-rock at the bottom of deep pools and at various places along the banks of rivers. In these caves the families of pī''tcūlya live in the same relations as do those of the Cayapa. Their women are especially beautiful and all have very long flowing hair. In the evening and at night, especially if the moon is bright, these spirits rise to the surface of the water and sport about, and it is at such times that the danger to canoemen in passing is greatest, since to see one of these spirits, and especially to approach so near that the spirit may blow its breath upon one, assures a severe attack of fever and is likely to cause death, although the patient may be cured by a shaman. The pī''tcūlya women wear a black skirt, and the men employ the same kind of clout and shirt as those of Cayapa men. All wear very large necklaces of various objects made by the prehistoric inhabitants of the region. Both sexes paint yellow all exposed parts of the body. Like certain other spirits, they are unable to eat solid food, but subsist on the steam and aroma rising from cooking fish.

Almost all deep pools in the river are the abodes of pī''tcūlya, although some contain more than others. Opposite Punta Venado is a large pool which contains many of these spirits. To reduce the danger to the people, the chief of the Punta Venado division of the Cayapa summons from time to time one or more shamans for the purpose of driving out the spirits at this particular place, because, being so near the village, they are believed to endanger the lives of those who assemble to attend the fiestas.

PAIŪ Ū'HMŪ

The paiū ū'hmū are a mythical people who formerly inhabited the region of the Rio Cayapas, but who are now rarely, if ever, seen in this section. By some they are described as creatures of about normal size and with heads similar to those of human beings, except that in place of the mouth they are provided with a sharp beak with which they kill people, and afterward, by inserting this beak into the skull, suck all the blood from their bodies. They never eat human flesh, but subsist entirely on human blood obtained in this way. By others they are described as giants, nine or ten feet in height, who, in place of a head, are provided with a long, bird-like beak with which they kill their victims and suck their blood. All informants declare that the paiū ū'hmū are black in color, that they wear no clothing, and make practically no sound except a low call. They particularly attack hunters who wander far out into the mountains, and for a lone hunter to encounter one is almost certainly fatal, though two together may overcome and kill such a being.

PEHŪRŪ PŪ'TYŪ

Another class of spirits, which are not particularly dreaded since they are never seen by man, are the pehūrū pū'tyū, a race of beings which in every respect are like the Cayapa except for the absence of buttocks and anus. There is a difference of opinion as to the abode of the pehūrū pū'tyū. Some claim that they are the creatures who inhabit the lower world, while others maintain that they live within the earth itself and that formerly they inhabited the region now occupied by the Cayapa themselves. According to these informants, at a time before the creation of the Cayapa there came a tremendous earthquake which overturned the earth and buried these pehūrū pū'tyū within it, where they still live in the same manner as when above ground. Then the Cayapa were created to live upon the earth; but at some future time another great earth convulsion will overturn the world again, bringing the pehūrū pū'tyū to the surface and burying the Cayapa and all other human beings.

The pehūrū pū'tyū, like certain other classes of spirits, subsist exclusively on the steam and aroma arising from caldrons of cooking food, this being sea-fish, which are very abundant where they reside. They have no homes, but constantly travel about. Like two other classes of supernatural beings, the pehūrū pū'tyū are incapable of sexual intercourse except when the moon shines brightly.

PA'LA'MBELE

A race of unimportant pigmies, called pa'ʟa'mbele, inhabits the eastern margin of the world, in the vicinity

of the hole through which the sun emerges from the lower world in the morning to make its daily tour of the heavens. These beings are said to be extremely small, owing to the proximity of their homes to the path of the sun, which is so hot as to stunt their growth. They never travel, and do neither good nor harm to man. There are, however, no corresponding peoples living about the orifice through which the sun disappears in the west.

PEJE BRAVO

In addition to the various spirits which inhabit deep pools along the river, there are what are known as peje bravo, large fish, armed with strong teeth, which sometimes attack canoes and canoemen, but which are also much feared because of their magic. Almost every pool of any considerable size along the river is reputed to contain one or more of these dangerous fish. To be sure they molest travelers only at comparatively rare intervals, yet they are much feared by canoemen. Like the spirits they may be driven from a particular locality, or they may be imprisoned in a cave or a crevice in the bed-rock of the stream and rendered harmless to passers-by. For instance, at a point known as La Herradura, on the Rio Onzole, there is a large pool at the lower mouth of a short, precipitous stream which cuts across a narrow neck of land for a distance of eight hundred or a thousand feet and connects one point of the main stream with another at least a hundred feet lower in altitude. The narrow neck of land connects a large hill with the mainland, and it is around the base of this hill that the main stream

of the river takes its course, thus traversing a distance of five miles or more in reaching the same level that the smaller and more rapid stream reaches in a comparatively few feet. It is this long bow in the main stream which gives this point on the river the name of La Herradura, "the horseshoe." During periods when the water of the river is at the ordinary level, the shorter stream is small, but in times of flood it is a raging torrent. By the time the water has run its short course and reënters the main stream, it attains a high velocity and shoots a powerful, billowy current far out into the main stream which here widens into a deep basin. At the sides of this current are numerous eddies, and often great logs and even whole trees are held by them and whirled about for hours, in which process large limbs are twisted from trunks and everything fragile is splintered into bits. It is impossible for a canoe to pass through this pool at such a time; it is, in fact, none too safe to skirt the extreme edge of the pool opposite the torrent which enters it, on account of swirling logs. It is small wonder, then, that the Cayapa should conceive some great supernatural force to be hidden in this pool. It is said that up to within the last few years there lived in this pool a school of immense bright-red fish, which were a constant menace to travelers. Even to see one of these fish assured the illness of a person, and death was almost sure to follow. Still more dangerous was it to touch one of them. These monsters had a trick of floating as if dead upon the surface of the pool, especially when the water was at normal level and the surface reasonably calm. Curiosity of passers-by sometimes tempted them to paddle near

enough to take a good look at the red object, or even to touch it, either of which proved fatal. At last, however, some powerful shamans visited the pool and by their incantations were able to impound the fish in a cave in the bed-rock at its bottom. They then sealed the mouth of the cave, it is said by some, with iron, so that for some years the pool has been passed without harm. However, there is still fear that the fish may some day break their bonds and again come to the surface and menace the lives of canoemen.

PĪ PĪ′NĪ

While there are many large pools along the Rio Cayapas which are given the general Spanish name charco, there is one so large and important that it is always known as El Charco. This is situated at a point about three miles down-stream from the confluence with the Rio Onzole. It was the former habitation of a kind of dangerous fish, or serpent, called pī pī′nī, literally "water serpent," concerning which the following story is told:

In former times El Charco was much larger than at present, covering the plain now adjacent to it and reaching from hill to hill on each side. Here lived an especially large pī pī′nī, which devoured everything coming down the river. It had a mouth twenty fathoms wide, and everything, including all driftwood and even entire trees that floated down-stream, was consumed by the monster. Within this great serpent there was an immense dry area in which accumulated all the logs and trees that

he swallowed. Naturally, all human beings who went down the river upon rafts (for in those days canoes were not used) were swallowed by the pī pī′nī, so that the population of the region decreased rapidly. In fact, this serpent became such a menace to travelers that at last no one attempted to pass El Charco by water. From a point above El Charco a trail crossed the hills and returned to the river at a point called Nañjara, a short distance below El Charco. When travelers wished to pass down the river, they moored their rafts at the upper end of the trail and passed El Charco by land, taking another raft at Nañjara and continuing their journey to the sea. The same change was made on the return trip. Finally, four powerful shamans determined to rid El Charco of its danger, and after devising a method of keeping fire for a long time, they started down the river upon their raft. On approaching El Charco, they steered for midstream, and passed, as did everything else floating on the river, into the mouth of the pī pī′nī. Within they found great quantities of dry wood, and also the bones of the people who had been devoured during the preceding years. These people were not food for this monster, but starved and thirsted to death inside him. Once within, the four shamans set fire to the dry driftwood and then proceeded with their palm-wood knives to cut out the vitals of the pī pī′nī. The heat of the fire caused the monster to vomit forth the four shamans, together with much of the driftwood and other things that had floated during all these years into his mouth. Thus the shamans escaped. The pī pī′nī had been killed, but continued to burn. The

shamans remained to see that every atom of the monster was consumed, for if even the smallest particle had remained a new pī pī′nī of as great or greater size would have grown from it. After this event the size of El Charco became what it is now, and a comparatively safe place to pass so far as supernatural dangers were concerned. As a matter of fact, however, at the present time it is a dangerous place in times of flood. There is a big bend in the river at this point, and a large pool with very strong eddies that make it necessary to use care in passing through it.

INVISIBLE TREASURE

There are stories current among the Cayapa of great invisible treasures in the form of caves filled with gold and silver which are guarded by invisible spirits, each of which carries a golden wand or lance. A shaman once visited one of these treasure caves and was told by the guardian that he would be given its contents if he would bring to him in exchange a child, a white dog, and a white cock. Neither he nor any one else has ever yet brought these, and the cave of treasure still remains unclaimed.

MYTHOLOGY

It is interesting to note that although there is such a highly-developed idea concerning local spirits, both malevolent and benevolent, and although these play an important part in the life of the people, almost nothing is obtainable in the way of myths. It seems strange

that with this highly-developed spirit concept there is not a similar development of related myths and tales, but no such special tales appear to be current among the Cayapa, and indeed the only resemblance to tales at all is the alleged experiences that certain individuals, during intoxication or sleep, claim to have had in their encounters with strange spirits.

There is nothing resembling a culture-hero cycle or any other cycle of myths. Animal stories, so common among aboriginal peoples, are almost unknown among the Cayapa. The two following short, fragmentary tales were the only ones obtained, and it is doubtful whether these are truly aboriginal with this people.

It is said that in ancient times birds and mammals had the power of speech, their language being that of the Cayapa. The toucan wore a silver necklace, and was constantly crying because there was no chonta dura to eat, although there was an abundance of other fruits. When he changed from his human form to his present bird form, his silver necklace became the white rim of feathers, which he now has, at the yellow throat patch, and his former crying for chonta dura he still keeps up in his constant propensity to give his characteristic call, "tcandō'tō," from which he derives his onomatopoetic name.

The jaguar also was formerly a human being who had a Cayapa wife. During the day he remained about the house in the ordinary manner and without wearing his shirt. At night, however, he put on a fine shirt ornamented in colors and went out to hunt. He killed much game, and ate the greater portion of it raw on the

spot. He brought home a small amount, but when it was cooked and his wife called him to eat, he never appeared hungry, consuming but a small amount and declaring that the food was not good. Later his form was changed to that which he now has, and he is obliged to walk on all four feet. His finely-colored shirt became his present spotted skin.

CEREMONIAL OBSERVANCES

Of aboriginal ceremonies there are few traces left among the Cayapa, so completely have the fiestas of the church supplanted them. In these festivities there are certain remnants of aboriginal customs, but they are entirely subordinated to the practices of the Catholic church.

Contrary to the customs of many aboriginal peoples, there are not at present, and apparently never have been, any special ceremonial observances associated with birth, puberty, and menstruation, although there are certain restrictions and slight observances of an ordinary character connected with each of these.

The marriage and mortuary ceremonies, already described, are, on the other hand, quite elaborate, and apparently retain much of their aboriginality, although largely assuming the nature of these ceremonies as celebrated by the church.

Two regular church festivals, that of "Noche Buena" or Christmas, and that of "Semana Santa" or Easter, are celebrated, as one might suppose, entirely according to church custom.

Another festival, having its origin in the Ecuadorian national holiday, August tenth, is also celebrated by the Cayapa, although the date of the event is never a fixed one with them. This is ordinarily the one time of the year when a priest visits the villages, and the date of its celebration depends largely on his convenience. However, regardless of the date of its celebration, this festival is always designated "La Fiesta de Agosto."

Usually combined with all these fiestas are what are called *bodas* and *ofrendas*. In its restricted sense the boda is a marriage ceremony or a marriage feast, while the ofrenda is the feast of the dead. The latter term is used in its more restricted sense among the Cayapa, and is a special feast held usually in honor of one or more relatives of the family giving the feast who have died within the previous twelve months, although such a feast may with equal propriety be held in honor of relatives long dead, especially if they had been notable people. The boda, on the other hand, partakes as much of the nature of a mortuary ceremony as of a marriage feast, and the word *boda* is used generally to include all kinds of feasting. At all gatherings of the Cayapa, regardless of their chief purpose, the people feast and dance a great deal, and much rum is consumed.

The three fiestas mentioned, as also the boda and the ofrenda, will be described from observations made on these ceremonies during 1908 and 1909.

La Fiesta de Semana Santa

"La Fiesta de Semana Santa," or the Easter festival, which is the most important and most elaborate of the

fiestas of the Cayapa, illustrates the completeness with which intrusive religious ideas may become engrafted on the beliefs of a primitive people.

As celebrated in 1909 at Punta Venado, this fiesta was of five days' duration, and in detail was as follows:

First day. Hueves Santo, April eighth

While many of the fiesteros reached the village on the previous day, a considerable number did not arrive until toward evening of this the first day of the fiesta. By evening, however, all had reached the village, and its population now aggregated about five hundred. On the first day there was no dancing or special feasting, but during the day several religious services were held in the church, consisting of simple "rosarios" said by one or another of the leading men of the village, or by one of the negroes present. The greater part of the day was spent by the men in completely clearing the plaza. Owing to the rapid and rank growth of vegetation, the entire village was overgrown with weeds, grass, shrubs, and vines, although it had been cleared to a considerable extent for the Christmas fiesta.

Second day. Viernes Santo, April ninth

The second day saw also no dancing or special feasting. Services similar to those of the first day were celebrated in the church throughout the day. A large number of banners were made of bandana handkerchiefs and bright-colored cloth, and about twenty-five candle torches of bamboo were constructed. These torches were made by

fastening in pairs, on opposite sides of a long bamboo pole, short joints of bamboo of the proper size to hold a candle. Some torches had as many as fifteen of these pairs of candle sockets, and in all there were spaces on the torches for upward of five hundred lights. The several stretchers used in carrying the images of saints and also an image of Christ were newly draped and prepared for use in the processions.

At about 7 o'clock P.M. criers were sent out to summon the people to the church for the first of the more important services of the fiesta, which everyone is obliged to attend. By 7:30 all had assembled. The doors were then closed and fastened, and guards placed over them to prevent anyone from leaving during the service. This rite was conducted by the sindico, or warden of the church, assisted by some of the head-men of the village, and at intervals as it progressed first one and then another of the numerous candles about the altar were extinguished until at last but one flame remained. This the sindico took into the vestry behind the altar, leaving the room in utter darkness, whereupon each of the men and boys immediately produced one or two large paddle-shape pieces of tough green bark, which he had kept concealed upon his person, and proceeded to castigate himself severely. The men all wore shirts made of light calico or of bandana handkerchiefs. That they might receive the full force of the punishment, however, each man pulled his shirt up about his neck and struck himself upon the bare back with his paddle. The blows were delivered with great force, making a loud whacking sound, but no severe pain was inflicted, as the paddles

EASTER FESTIVAL AT PUNTA VENADO

FIRING "SALVOS" IN THE PLAZA

were flat and very wide. After about ten minutes of this castigation, the sindico returned from the vestry with the candle, the paddles were dropped, and all the men and boys scurried off to the side and rear walls of the church.

This self-inflicted punishment is in this particular region confined to the Indians alone. Although there is a large negro population, and many negroes attend this ceremony, none participate in this part of it. The negroes in certain other sections, namely, to the south of Esmeraldas, are said to inflict similar punishment on themselves, while those of some other parts are quite unacquainted with the custom. This, together with certain other observances, such as whipping with a cat-o'-nine-tails on Easter Sunday, may be due to the influence exerted over the Cayapa by early Catholic priests. That the same customs do not prevail among the negroes is due seemingly to the fact that at the time of the later influx of negro slaves, other orders and other church customs had superseded those which may have given these particular ideas to the Cayapa. It is possible also that in certain of these customs there is a vestige of some aboriginal ceremonial observances, but if so it is not now possible to segregate them.

On the return of the single light to the altar, several other candles were lighted and the service was concluded by further responsive chanting.

Next was formed a procession, in which practically everyone appeared, headed by bearers of a cross and images of saints, followed by bearers of the candle torches and the banners, and by a large number of other fiesteros. Each person, whether carrying anything else or not, bore

a short candle in one hand. In addition, a considerable space in front of the church was filled with row upon row of candles, and nearly all the houses in the pueblo, especially those near the church, were illuminated with candles. In all, not fewer than twelve or fifteen hundred candles were thus used. As is usual with such processions, there was much shooting of firearms in front of the church immediately before the procession came forth. After passing round the church and about the plaza, the procession returned to the edifice, where the images of the saints were redeposited at the altar, and the banners, and also the torches, which were still burning, were placed about the walls.

After the chanting of another rosario, two long spears were taken to the front of the church and crossed between the front house-posts, which were twenty feet apart and about fifteen feet back from the door. The spears were crossed at about a foot from their points, the shafts passing upward and their ends resting each upno the shoulder of a man at one of the posts. Directly behind the point where the spears crossed was placed a short piece of lighted candle, one that would burn out in twenty or thirty minutes. As such a piece of candle was consumed, two other men relieved the guards with the spears. These remained on duty during the burning of another candle, when they in turn were relieved. This guard, typifying the guard before the tomb of Christ, was maintained uninterruptedly until about 3:30 A.M., when the procession with the images of saints, the candle torches, and the banners, was repeated. For the exit and reëntrance of the procession, the guards with-

MUSIC IN A RANCHO

PROCESSION CIRCLING THE PLAZA

drew their spears and permitted passage through the central space between the house-posts. At all other times no one was permitted to pass between these posts, although frequent services were held throughout the night.

On the return of the procession to the church and the redepositing of the images, banners, and torches, the space between the house-posts was closed by the spears and the guard kept as before until about 7:30 A.M., when another service, a "gloria," was chanted. During this service the guards circled about each other, each slowly twirling his spear in the right hand, much as a man may twirl a cane. Toward the close of this service the spearmen mounted guard at each house-post, with the spears held vertically and with the points up, but after its conclusion the guard was no longer maintained.

Third day. Sabado Santo, April tenth

After the early morning ceremony above referred to, nothing other than the chanting of rosarios took place in the pueblo until about noon. A dance was then commenced in one of the houses and continued until nearly dawn of the following morning.

Fourth day. Domingo de Pasqual, April eleventh

Shortly before dawn, four images of saints were placed in a small "rancho" in the plaza. Here also were brought the marimba, the drums, and the rattles used in the dance during the night. The exterior of this structure, with the rank growth of grass and weeds in the plaza about

it, is shown in the background of pl. CXXXII. In pl. CXXXIII part of the structure is just visible below the cloud of smoke before the church, and in pl. CXXXVI it is shown in the background. In both of these the plaza is shown completely cleared of vegetation as it appeared during this particular fiesta. The interior of the "rancho" with the instruments and their players is shown in pl. CXXXIV. Here throughout the day, until about 4 P.M., the music was continued almost without cessation, regardless of the fact that services, processions, and feasts were at different times in progress in the pueblo. It is the custom to give the images guarapo to drink on this one day of the year, and this must be done very ceremoniously and with much music. The images themselves are supposed never to drink rum, nor is it drunk in their presence, but great quantities of guarapo are consumed actually by the fiesteros as well as ceremonially by the images. A small calabash is filled with this drink and is held to the lips of the image for some minutes, or if the image is so placed that the calabash cannot be placed to its lips, they are moistened with guarapo by dipping the finger into the liquid. The images having been allowed to imbibe from this calabash, its contents are either thrown on the ground or drunk by some of those present. In addition, other guarapo is constantly drunk by the fiesteros. Almost no rum is drunk in the vicinity of the "rancho," but in case it is desired to drink rum, etiquette requires that a person must turn away from the saints, otherwise they would be displeased at the sight.

At about 8:30 A.M. a service was held in the church,

PANTOMIME OF THE ANGEL DESCENDING TO THE TOMB

PROCESSION REENTERING THE CHURCH

followed by an ofrenda, or feast for the dead, in one of the houses, and simultaneously by a procession about the village, some attending one and some the other. The procession was similar to those held during the night, except for the absence of the candle torches and the addition of a pantomime of the descent of an angel upon the tomb of Christ.

Among the Cayapa there is celebrated on this particular day a kind of passion play in which an attempt is made to act out in a small way the resurrection of Christ. In the center of the plaza, and not far from the "rancho" where the saints were drinking guarapo, was a scaffold about fourteen feet in height, in the floor of which was an opening through which a small boy, dressed in full European costume of white cloth and with white-cotton imitations of the wings and tail of a bird, was lowered by means of a rope upon a representation of the tomb of Christ. This tomb was a kind of box made of slats carved in ornamental forms, in which rested an image of Christ and over which a black cloth had been placed. As the boy who impersonated the angel was lowered from the staging by a couple of men, he extended his arms and legs as a bird might extend its wings and tail, and, nearing the tomb, he siezed in his mouth the black cloth and was drawn back to the staging, typifying the return of the angel to the sky. In pl. CXXXVI is shown part of this scene. The boy dressed in white and holding the black cloth obtained in his descent upon the "tomb" may be seen standing with the two men on the scaffold. The "tomb" is just being removed from under the scaffold. The procession then wended its way, circling round the

church, as shown in pl. CXXXV, and passing again down the plaza, this time to the "rancho," which it circled, finally returning and reëntering the church (pl. CXXXVII).

At about 10 A.M. the sub-chief took his place at the extreme left of the altar, and criers were sent to summon all to the church for the annual castigation with the cat-o'-nine-tails, which punishment is obligatory upon all the Indians, both old and young. This ceremony, however, is never participated in by the negroes. If a man, the devotee bows or sits upon the left heel; if a woman, she bows or sits before the altar and receives one or more strokes from the cat-o'-nine-tails, which always has five points, so that each stroke counts as five lashes. The devotee must receive one stroke, and may take as many more as he desires. Often a person takes two or three strokes, and later returns once or even several times for an equal number. The castigator uses discretion in inflicting the punishment—to an adult he admisters blows with full force, but to a child the blow is light. The men come in their usual attire and receive their lashes upon the thin and very tightly drawn clout. The women, on the other hand, dress especially for the occasion, putting on always a calico or bandana covering to completely hide the face and the upper part of the body and wearing their newest and best manta. Frequently several mantas are worn one outside the other, for protection against the blows. It is customary for the women to make and to keep a manta for this special occasion and which after the ceremony may be worn every day, but it must never be worn before the ceremony. Comparatively small boys and girls come vol-

CASTIGATOR WITH CAT-O'-NINE-TAILS

THE CEREMONIAL WHIPPING

untarily for this castigation, but children of from two to five years are usually accompanied. If necessary they are brought forcibly by their elders. The very small children generally receive but a light tap from the castigator.

A few minutes after the castigation at the altar commenced, an assistant took up his position just outside the door of the church and there administered punishment to any who desired it, after which they were at liberty to enter and receive still more at the altar if they desired, although this was not necessary. Pl. CXXXVII presents a view of this castigator with his cat-o'-nine-tails. Pl.

FIG. 28.—Technic of cording on cat-o'-nine-tails

CXXXIX, 2, shows him in the act of striking a devotee. In actual practice this was done at the door of the church. These two pictures, however, were posed at a short distance from the building in order to gain a better light. Fig. 28 shows the technic of cording on the whip.

By 11:30 the castigation of the devotees was finished and the second ofrenda of the day was called. Nearly everyone attended, but a few remained at the "rancho" to play before the saintly images there.

At about 4 P.M. the saints from the "rancho" were re-

turned with proper ceremony to the church, and the ceremonies of the fiesta proper were ended.

The night was spent in dancing, although this was not an essential part of the ceremony. By evening of the following day (Monday) all the fiesteros had started toward their homes, and some even left the village during the afternoon of Sunday.

This fiesta is the most important of all the gatherings of the Cayapa and is one which almost all attend even though they may be so situated that the journey to their particular village is a difficult one, and may never attend the other gatherings of the year. Even those Cayapa who live on the Rio Verde and at other distant points endeavor to return to their old home village to celebrate this particular ceremony.

La Fiesta de Noche Buena

"La fiesta de Noche Buena," or the Christmas festival, is the less important of the two strictly religious ceremonies of the Cayapa, and, while the services are held by the sindico, or guardian of the church, and by others, these are not so elaborate as are those held at Semana Santa just described, and less interest is displayed. All these services and indeed the entire conduct of the fiesta are almost identical with those of Semana Santa, except that various of the ceremonies and processions, especially those concerned with enacting the resurrection of Christ, are absent, as is also the ceremonial drinking by the images of saints. There is much dancing both day and night, and there are frequent feasts, some being

of the type known as bodas and others of the type known as ofrendas, given by different persons.

This is one of the principal times when offenders against tribal laws are punished, although they may be punished with equal effect at any other public gathering. This fiesta usually lasts from three days to a week.

La Fiesta de Agosto

As before stated, the date of the Fiesta de Agosto is quite irregular, depending largely on the convenience of the priest who is to attend. The whole fiesta had its origin in the Ecuadorian national holiday, August tenth, and by the whites and negroes of other parts of the province it is celebrated always on that date. Among the Cayapa, however, this festival takes the place of the Easter fiesta as celebrated among the whites and negroes, in so far as the services of the priest are concerned. Whereas he always celebrates Easter at some point near the coast, and the whites and negroes almost always attend, the Cayapa await the arrival of the priest at their own villages for any such special services.

At a time when they know that the priest is in one of the villages at the mouth of the river, usually the village of La Tola, during the late summer or early autumn, a deputation is sent by the Cayapa to invite the priest to come to their villages to hold this annual fiesta. Governed largely by other engagements, the priest appoints a time when he will be able to be present; the Cayapa officials then notify all the people of a given village to assemble at that particular time. A day or so

before the appointed time a large canoe manned by a deputation of Cayapa is sent by the chief to La Tola, or wherever the priest may happen to be residing at the time, and he is brought up. His arrival at the pueblo is usually preceded by the gathering of practically all the Cayapa who can attend the fiesta, although some stragglers may not appear until the following day.

In each of the three Cayapa villages there is a special house, known by the Spanish term convento ("monastery"), which is reserved for the priest and at no time is ever occupied by anyone else. After establishing himself the priest usually goes directly to the church and holds the first service, and thereafter throughout his stay he is kept busy holding services of one kind or another. Usually two regular services are held each day, besides the various special masses for the repose of the souls of the dead, especially those who have died within the year. In addition to these services the priest officiates at all the marriages, baptisms, and confirmations for the year past. He remains usually from a week to two weeks at each of the three Cayapa villages, depending on the interest of the Indians and the apparent need of his presence.

As in each of the other fiestas described, ofrendas and bodas are held almost every day, and sometimes several in a single day. Except in one particular these are the same as the ofrendas and bodas at the other fiestas and those celebrated between times. On this occasion every one who intends to give a feast usually brings to the morning service in the church a small portion or several small portions of each kind of food to be used at the feast.

These are placed on a table specially provided for the purpose in the center of the church, and a particular blessing is given these by the priest during the service. They are then usually taken to the convento as a gift to the priest, or they may be taken back to the feasting table.

During his entire stay the priest is provided by the Cayapa with an abundance of all kinds of native foods. Every morning quantities of plantains, yuca, fruits, game, and fish are taken to the convento, and in every way the Cayapa see that he is abundantly supplied. In addition, of course, he is paid in money by them for the various masses and special services which he conducts.

Boda

In the strictest sense of the term, a boda is a marriage feast or ceremony. Among the Cayapa, however, it has attained in addition a more general signification, being applied to any gathering at which there is feasting and dancing, but which is without special church services such as are held in the fiestas. A boda therefore usually includes, besides the ordinary feasts proper, other special feasts known as ofrendas, which are really feasts for the dead. In addition there are usually held certain simple church services which do not require the presence of a priest. Usually a number of bodas are held during the course of the year. Each in a way is a personal or family festival, and is almost always given by one, or not more than two, families. They are all practically alike in their essential features. A detailed description of one will give an adequate idea of all.

A boda held from January seventh to tenth, 1909, was as follows:

At the Christmas fiesta announcement was made that two certain families would give a boda on January seventh. Meanwhile the members of these families commenced to accumulate the provisions for the feasts. Much hunting and fishing and drying of meat were done; rum was distilled; vegetal foods were procured; and, not the least in importance, a trip was made to the ocean to procure shellfish and crabs. On the afternoon of January seventh, accordingly, a considerable number of people assembled, still others coming in on the following day. No feasts or special ceremonies were held until the next day.

First day. January eighth, 1909

At about 9 A.M. a service was conducted in the church, followed by feasts in one of the houses of the village.

The first of these feasts was an ofrenda. While the service was being held in the church, the members of the family, assisted by friends, were placing upon the table all the food which had been prepared the night before. The table, as usual, was prepared by spreading upon a considerable area of the floor a covering of the large leaves of hoja blanca, and upon these were placed all manner of eatables. Liquids or semi-liquids were contained in pottery or calabash dishes, and dry foods were placed directly upon the leaves. There were many of the various mammals, birds, and fishes of the region dried and smoked until almost jet black; monkeys, guatins, squirrels, zorras, woodrats, and other mammals

dried whole; and guantas, deer, jaguars, pumas, armadillos, sloths, and wild hogs, all in dismembered parts. Among the birds were parrots, toucans, doves, grouse, wild turkeys, herons, and egrets, all dried whole. Dried fish of various species, especially the shad, were present. In vegetal foods also there was great variety, as the plantain, yuca, papaya, rascadera, sugar-cane, coconut, guabo, zapote, bread-fruit, orange, chonta dura, and palma real. Care was taken in arranging the table to see that there should be as much display as possible. The dried mammals and birds were in many cases placed in erect poses, and fruits or pieces of other foods were placed in the beaks of the birds and in the mouths or between the paws of the mammals. In one or two instances mammals were so posed as to appear as if fighting.

Directly after the service in the church, to which a small portion of the food was taken in order that by its presence during the service it might receive the blessing for all the food used in the feast, all the people of the village congregated at this particular house. The men and larger boys occupied the room in which the table was spread, and the women, girls, and small boys the room adjoining. The givers of the feast then presented to whomsoever they thought proper various articles from the table, such as a dried mammal, bird, or fish, and some fruit. These were for the recipients personally, and were to be taken home by them. On receiving such a gift, a man always took it personally or sent it to some of the women of his family in the adjoining room. This division of the food took a considerable part of what was

upon the table; the rest was divided into small bits, and, after an invocation by the warden of the church, the men and boys, all seated on low benches about the table, proceeded to feast. The women meanwhile partook of a portion of the food that had been sent to the next room to them. Having finished the meal, a benediction was pronounced by the warden and the floor was cleared of all scraps of food and the leaves forming the table.

Immediately fresh leaves were spread as at first, and the boda, the word being here used in its more restricted sense, was served. While an ofrenda has a very elaborate assortment of foods, a boda has only fish, oysters, or meats cooked in ripe plantain in the form of a thick gruel. This is served always in the aboriginal pottery plates of the kind shown in pl. LXXXVII, 4, although for everyday use dishes of European manufacture have almost entirely supplanted the pottery plates formerly used. In this particular case the boda consisted of a single course of plantain and fish, but sometimes other courses are served in order. The feast having been finished, the majority of the people went to their respective abodes in the village or to the house of the chief.

At such gatherings offenders against the law are usually brought before the chief, by whom justice is dispensed and differences between individuals adjudicated. On this particular occasion several matters of this nature demanded the chief's attention. The details of these will show something of the methods of dispensing justice among the Cayapa.

Immediately after the boda on this first day the chief sent some officers to bring before him certain offenders

against the law. The offenders were, in this case, a man and a woman. The man had deserted his wife and child after abusing them for a considerable time and had assumed relations with a young widow. He had therefore been guilty not only of infidelity and abuse, but also of violating the immutable law forbidding divorce. The woman's crime was somewhat less grave. Being a widow, she had a right to remarry, but she had no claim to the husband of another woman. In justice to the Cayapa as a tribe it should here be remarked, as has been elsewhere pointed out, that cases of infidelity, wife-desertion, and abuse are extremely rare. Almost without exception the family relations are held sacred by both men and women, and in general the relations existing between the sexes are governed by stringent laws which are regarded faithfully. In this instance both the offenders were brought to the house of the chief and were placed in the stocks where they remained during the afternoon. The man displayed no sign of emotion, but the woman wailed and chanted the greater part of the time. Both were remonstrated with by friends, and the mother of the woman sat beside her almost constantly, weeping and chanting her plaint at the disgrace that had been brought upon the family by the daughter's misconduct.

It would appear that the keeping of such offenders for many hours in the stocks is an exemplary measure and is done for the effect which it will have on the community at large. The punishment which they are to receive is often decided on long before its infliction, but they are kept in the stocks as an example to the people at large

and especially to the younger generation, and their conduct is discussed both privately and publicly throughout the village and its evils are pointed out. Especially is this done by the public utterances of officials, who speak in the large hall in the chief's house where the offenders are incarcerated.

Toward evening the prisoners were released from the stocks and permitted, under guard, to take food, being later returned to the stocks. About nine o'clock a gathering assembled in the room, the man was taken from the stocks, and several of the officials, including the chief, made short speeches concerning the pair and their crime. One of the speakers was a woman, a relative of one of the offenders. At last the sub-chief spoke rapidly and eloquently for about twenty minutes, berating the man for his conduct and his disobedience to the laws of tribal society.

Finally the commission of officers who had been sent in the morning to bring the two for punishment was called forth and its leader gave a ritualistic invocation, after which the offending man was brought forward and made to stand before the stocks with his body inclined slightly forward. The chief then administered fifteen strokes with the cat-o'-nine-tails, the equivalent of seventy-five lashes. The culprit was destined to receive a greater number of strokes, but owing to the chief's infirmity due to a recent gun-shot wound, and to the fact that the culprit proposed to buy partial immunity with rum for the assemblage, he was given his liberty after receiving the punishment noted.

The woman was then brought forward and received

ten strokes, or fifty lashes. Her case, however, was different from that of the man, and she was not then set at liberty. By living with the man she signified her desire to marry, hence it was determined that a husband should be found for her. She was therefore placed under a guard of three officers for the night, while the officials set about to find a man who would consent to take her as his wife. She was thus held in custody until January eleventh. Meantime an old man living on the Rio Camarones was found who was willing to marry her. As a matter of fact, her relatives had tried to arrange the same marriage some months before, but as she was unwilling to marry the old man, the priest had refused on his last visit to the village in October, to perform the ceremony. When the boda ended on the afternoon of January tenth the woman was given into the custody of the chief's wife, being held in the chief's house until the following morning, when a commission of three officers called for her and delivered her to the old man who was supposedly destined to become her husband. As a matter of fact, she remained with him only a few days, when she and her paramour stole away to parts unknown.

Second day. January ninth, 1909

A short service was held as usual in the church, followed by another ofrenda. This was marked by disorder in dividing the food, everyone grabbing for what he considered a proper share. This was in very bad taste, according to Cayapa etiquette, and was loudly condemned by the older men. This misbehavior was prob-

ably due in part to the increased drunkenness, which was apparent throughout the day, but was due more largely to the greed of several negroes present.

After this feast the floor was cleared of remnants of the meal and of the leaves used to make the table. The second feast, the boda, was then served as usual. This consisted of three courses, each served on the same plate in the case of each individual, care being used in replenishing the supply that the plates of different individuals should not be interchanged. The three courses of these mush-like foods consisted of plantain with fish, plantain with meat, and plantain with oysters. In case any individual did not eat any or all of his portion, it was taken to the next room by the host or by one of the attendants and given to one of the women of his family. The men giving the boda served the guests, while the women attended to filling the plates.

In this particular instance the whole of the previous night had been spent by the hostess and her friends in cooking and preparing the plantain mushes used in this boda. While hot they were poured into burden-baskets lined with leaves. When served they were cold and very thick.

Immediately following the feasts another refractory pair were brought to justice. In this case the man had forsaken his wife and for three months had been living with his first cousin, who had deserted her husband. Each of the culprits, therefore, was charged with the double crime of desertion of spouse and cohabitation with first cousin. These are considered great breaches of tribal law and are severely punished. As on the previous day,

the offenders were placed in the stocks, remonstrated with by relatives and friends, and finally whipped. In this case the man received a hundred and seventy-five lashes, or thirty-five strokes of the cat-o'-nine-tails, and in addition was required to pay a fine in money amounting to about fifteen or twenty sucres. The woman's punishment was a hundred and twenty-five lashes, or twenty-five strokes. The greater severity of the punishment in the cases of these two offenders was due to the fact that they were first cousins, which relationship prohibits marriage under any consideration.

Another example of punishment was witnessed late in the afternoon. A young man had inbided freely and while in his cups ran amuck in two or three houses. Others endeavored to quiet him, and to hold him and prevent serious trouble, but he seemed crazed with the rum and determined to fight, until finally it became necessary for officers to take him in hand. After a struggle he was carried to the stocks and secured by one foot. He fought desperately to release himself, but finally fell asleep and after several hours awoke in a much better mood.

In this instance was shown a good example of the devotion of the Cayapa women. Throughout his drunken frenzy the young man's mother had endeavored to quiet him, and for her trouble been struck by him repeatedly. Nevertheless, as soon as he quieted down in the stocks she took up her station beside him and fanned him almost continuously during the time he slept. Such instances are very common. It is not considered a disgrace for anyone, either man or woman, to become intoxicated,

and the care of those who are sober is to see that a person does no serious damage while in that state. The rum used produces a cycle of symptoms, beginning with jollity and loquacity, passing through a desire to display skill, such as bending hands with an opponent, and ending with a frenzied desire to fight. It is then that the women usually take a hand and try to pacify the men. Sometimes several women are required to hold a drunken man and prevent serious trouble.

In the case of the young man above mentioned, no further punishment was inflicted. When he awoke in a fairly sober state he was taken before the chief, who lectured him on the error of his ways, and warned that if he repeated the offense he would be castigated and fined.

Third day. January tenth, 1909

A brief church service, preceded and followed by a procession about the plaza, was held in the forenoon as on the two previous days, and was followed by an ofrenda and a boda. Whereas on the two previous days the ofrendas had been more for the dead in general, in this case there was a feast for a person who recently had died. This fact brought out another interesting custom. After the feasting (both the ofrenda and the boda) was finished, the sub-chief took his position at one end of the hall and administered a stroke or two with the cat-o'-nine-tails to each member of the family who had given the feast, and many others presented themselves for similar castigation, but it was compulsory only with the members of the immediate family and their relatives.

During the feasts the cat-o'-nine-tails used for the castigation, together with various articles of apparel of the deceased and certain articles given for the purpose by relatives, was suspended upon a pitigua cord over the table. These articles were later distributed among some of the guests not related to the family.

After these feasts and the attendant ceremonies many of the people went again to the chief's house. The same pair of culprits who received punishment the day before were again brought in, placed in the stocks, and later castigated. The woman received twenty-five strokes, or a hundred and twenty-five lashes with the cat-o'-nine-tails, while the man was given between thirty and forty strokes. The whipping of the man was due chiefly to the fact that he still refused to return to his lawful family. Even after he had been thus severely whipped by some of the officers a second time and was brought before the chief, he refused to return to his family. The chief and others argued with him and tried again to persuade him to see the error of his way, but he stoutly maintained that he would not return, and the chief finally became so vexed that he gave the culprit a couple of resounding slaps on the side of the head and remanded him to the stocks where he remained nearly the rest of the day. Toward evening he was liberated and was not further punished. It is very unusual for the chief to slap a culprit, and such an act is done only under great provocation. In the case of almost anyone else, such a slap would be highly resented and would result in a fight, but a culprit does not dare offer resistance to the chief under such circumstances.

PHYSICAL ANTHROPOLOGY

General Characteristics

The measurements of seventy individuals which follow were made during the last days of the stay among the Cayapa. On departing from New York for this region no anthropometric instruments were available, and arrangements were made to have a set sent later. However, month after month having passed without the arrival of the instruments, it became necessary, near the latter part of the stay, to make them. Through the kindness of Señor Don Donato Yannuzzelli, owner of the Hacienda of Palma, the author was enabled to make a serviceable measuring rod in the shops connected with Señor Yannuzzelli's sawmill. For this purpose a thoroughly seasoned piece of hardwood called in Spanish guayacan was procured and sized with exactness. This was then carefully graduated with a metric rule and when provided with a spring-arm made a serviceable instrument.

Care was always taken to keep the rod from getting wet or subject to conditions that would tend to change its length. After the completion of the measurements the rod was proved with metric rules to make sure that no change in length had taken place. This rod, a pair of calipers lent by Señor Yannuzzelli, and a small thirty-centimeter rule, provided the instruments necessary for the work, and it was possible with these in a short time to procure the measurements here presented.

In the majority of cases the Indians submitted readily to measurement, and had more time been available it

would have been possible to obtain a much more complete series. However, with this series of seventy measurements, of which thirty-six represent males and thirty-four females (including nineteen adult males and twenty-one adult females), it is possible to arrive at a fairly clear conception of the physical characteristics of the Cayapa as a tribe. These measurements and the indices computed from them appear in tabular form in the following pages.

The tables of measurements and indices show that the Cayapa on the whole are short in stature, the men averaging only 155 cm. and the women only 146 cm. The range of individual variation among the men, as also among the women, is 14 cm. Among the men there are at least a few individuals who appeared to be somewhat taller than the maximum here given, but as a tribe the Cayapa must be considered somewhat below the average in stature. The difference in stature between men and women is 11.27 cm.; that is to say, the men are 7.7 percent. taller than the women. Considering the fact that the Cayapa as a tribe are low in stature, this is a high percentage. In fact in most races of low stature this difference usually approaches 5 percent. of the female stature. Larger series would probably alter these results somewhat, but it seems probable that they would remain substantially the same since the individuals measured, of both sexes, were about the average of the tribe as a whole.

According to the averages of the cephalic indices of all four classes, men, boys, women, and girls, the Cayapa are clearly brachycephalic. Further, when the indi-

vidual measurements themselves are considered, the boys, women, and girls clearly fall into this division, for there are in these three classes fourteen, seventeen, and eleven individuals respectively who are brachycephalic, as against three, four, and two who are mesocephalic, these nine only being below 83.33. In the case of the men, however, there is a slightly greater number of mesocephalic than of brachycephalic individuals, the numbers being ten and nine respectively. That the average index of the men falls within the brachycephalic division is due to the fact that the mesocephalic measurements, though greater in number, approach the brachycephalic limit, while six of the nine brachycephalic measurements are well up in that division, ranging from 87.5 to 90.5. This makes the average high and brings the class of men also just within brachycephaly.

Considering now the relations of these measurements from the standpoint of the interrelations of sex and age, we find that the heads of the men, with an average index of 83.58, are materially longer than those of the women, with an average index of 86.85. This is due to the fact that the head of the man is of much greater actual length (10 mm.) than that of the woman, while the actual width of the man's head differs comparatively little (only 2 mm.) from that of the woman.

Among the boys, however, this index, which is 86.37, approaches very nearly that of the women, and differs less than one degree from that of the girls, which is 87.30. Some discrepancy arises in this case from the fact that these averages are derived from different numbers of individuals (17 boys and 13 girls) and also because there

are certain differences of age, the girls being on the whole somewhat older than the boys. To obviate this a computation has been made in which the last 13 measurements of boys (nos. 5–17) only have been taken. As it happens, these measurements are of individuals more nearly of the same age of the thirteen girls measured, and the element of extreme youth among the boys is thus eliminated. This computation gives an index of 86.04, which still leaves the index of the boys much nearer that of the women than that of the men, the differences being 0.71 and 2.46 respectively.

It would appear therefore that the head proportions among the adult females differ very little from those of childhood, while in the males the head has a marked tendency to elongate with advancing years.

While dealing with the physical characteristics of the Cayapa it should be noted that in certain of those outward characteristics which are most manifest to the eye, the individual differences are very great. The hair varies from jet-black to a very dark-brown in color, and from absolute straightness to a very pleasing waviness, though in no case is there any near approach to curliness. It is ordinarily fine, though among the men some individuals are found whose hair is moderately coarse. These features are, of course, more noticeable in the women that in the men, since the women always wear their hair long and flowing, whereas the men keep their hair cropped fairly short, though in earlier times they too wore long hair. In many cases the women's hair reaches to the waist, and is very full and heavy. Such, for instance, is the case with the middle-aged woman

shown in pl. xx. Under ordinary circumstances most women wear their hair full-length in this way, but frequently a case (as in pl. xix) is found where the hair is comparatively short. This is due to the custom of cropping the hair on the death of a relative. An example of waviness of the hair is given in the case of the woman shown in the latter plate. The hair in this case is dark-brown. With advancing years the hair tends to become thinner, but no case of even partial baldness was observable either among the men or the women. Throughout life the hair retains its color in almost every instance, but rarely a person is seen who shows a sign of grayness, and one old man was found whose hair was white—it had become thus many years before, though no one knew the cause. No other individual with white or even partially white hair was encountered, and it was claimed by the Indians that the old man referred to was the only individual in the tribe who exhibited this peculiarity. The fact that the hair retains its color so well is probably due to the fact that the Cayapa practically never wear any form of head-covering.

Considerable variations are found in the form of the nose. In some it is wide and rather flat toward its tip, this appearance being due to a considerable distension of the nostrils, the openings of the nostrils being in many cases quite round. However, it escapes completely any approach to the true mongoloid type from the fact that in no case is there such a lack of bridge as is found in the real mongoloid nose. In fact, the contrary is quite the case, and in many instances the bridge is quite high, giving the nose the impression of slight aquilinity.

One individual was observed whose bridge was quite high and aquiline, though this was a decided exception. In these high-bridged noses the actual width of the nose at the alæ is usually somewhat less than in the more monogoloid type above mentioned.

So far as noted, the eyes are invariably dark-brown, and the upper lids often show more or less of the mongoloid fold. In some instances this fold is so marked as to give the eyes a perceptible slant. In many other individuals, on the other hand, the fold is so slight as to be almost unnoticeable, and the eyes are wide and frank in consequence. In most cases the supraorbital ridges are not at all prominent; the forehead therefore appears full and is also fairly high. Now and then is found an individual, especially among the men, whose supraorbital ridges are fairly pronounced. The eyebrows are usually black, but are only moderately heavy.

In almost every case the malars are high and prominent, and the general appearance of the face as a whole is round, though now and then is seen a person whose face gives the appearance of much greater length than breadth.

In the majority of individuals the upper lip is fairly broad and heavy, though the lips are in no case unusually thick. In most instances the chin has moderate prominence, though it never shows any special degree of protrusion.

No opportunity was presented for actually weighing any individuals, but from their general appearance it may be said that as a rule they tend neither to obesity nor to thinness. Now and then slightly obese or slightly

spare individuals are found, but as a rule they are in that state which would be termed "in good flesh." It is noticeable, however, among the very young children that there is a marked protrusion of the abdomen. In most cases this may probably be ascribed to the fact that their diet consists very largely of green plantains and that they devour these in quantities at all times of day; however, it must be said that no illness seems to result from this practice. As the children advance in years this protrusion of the abdomen grows less, and during the greater part of their remaining years they are well proportioned in every respect. Now and then is encountered an old person who tends toward protrusion of the abdomen in declining years, but these instances are exceptional.

In color the Cayapa are a fairly light reddish-brown. They are, in fact, much lighter than the average of the North American Indians, and it seems probable that the climatic conditions under which they live have at least something to do with this particular feature. As was stated in speaking of the climatic conditions in the Cayapa country, the sky is almost continuously overcast, the sun rarely shining brightly for more than a few minutes at a time. Even these short intervals of sunshine are very infrequent, sometimes weeks and even months passing without full sunshine. Furthermore, the Cayapa region is almost windless. While rains are practically of daily occurrence, they are almost never accompanied with wind or other storm features. Tanning from sun or wind is therefore practically impossible so long as the Cayapa remain at home.

CHOLO BOYS

An interesting example of the possible differences in skin color is shown, however, when any of the Indians journey to the coast, and especially if they voyage a considerable distance at sea, which they frequently do when some of them have occasion to visit Tumaco or Esmeraldas. On such occasions they take their canoes out to sea and paddle, skirting the shore-line for a considerable number of miles. The trip from Limones to Esmeraldas necessitates a journey of about fifty miles on the open sea, and ordinarily requires at least a week. For such trips the Cayapa usually dress specially, in that they put on extra necklaces, neckbands, and wristbands, and otherwise ornament themselves for the occasion. Their tight-fitting neckbands and wristbands are never taken off while they are away from home, consequently the portions of the skin covered by them are protected from the influence of the elements. When they return home, however, this finery is usually taken off. The contrast between the covered portions of skin and the exposed parts is striking, even though the intervals of sunshine along the coast are practically as infrequent as along the river. The sea breeze has a marked tanning effect, consequently the traveler returns home almost as brown as many of our North American Indians who are subjected to sun and wind during much of the year. The covered portions of the skin, however, remain the same color as when the Cayapa leaves home, and it is therefore possible to contrast the natural color with the tan. No color charts were available for purposes of comparison and exact record, but the differences between these two tints are considerable and show the natural color of the Cayapa, as previously mentioned, to be

much lighter than that of the average North American Indians.

In a word, therefore, the Cayapa may be said to be a well proportioned, though somewhat undersized, light-brown people, with brachycephalic heads, black or dark-brown hair which varies from straight to wavy, to show considerable variation in the shape of the nose, to have very dark-brown eyes, wide upper lips, full and fairly high foreheads, high cheekbones and round faces, and to have supraorbital ridges and chins that are not at all prominent.

No opportunity was presented to measure the few Cholo who live on the Rio Cayapas. They are, however, of quite a different type from the Cayapa, being somewhat shorter and more thick-set than the latter, and as a rule more mongoloid in general appearance. In pls. CXL-CXLII are shown two boys, two girls, and one young man of about twenty-one years, all members of this tribe.

Measurements

In the accompanying tables the following abbreviations are used:

St, Stature.
Str, Stretch of arms.
Sh, Height of shoulder (acromion).
Hmf, Height of middle finger from surface upon which heel rests.

CHOLO GIRLS

YOUNG MAN OF THE CHOLO TRIBE

A, Length of arm (acromion to tip of second finger).

Hs, Height sitting.

Wsh, Width of shoulders between acromia.

Lfa, Length of forearm (elbow to tip of middle finger).

Lh, Length of head.

Bh, Width of head.

Wf, Width of face between zygomatic arches.

HfI, Distance from hair line to chin

HfII, Distance from nasion to chin.

Hn, Height of nose.

Wn, Width of nose between alæ.

$IStr, \frac{Str}{St}$

$IA, \frac{A}{St}$

$IHs, \frac{Hs}{St}$

$IWsh, \frac{Wsh}{St}$

$FI, \frac{HfII}{Wf}$

$NI, \frac{Wn}{Hn}$

$CI, \frac{Bh}{Lh}$

TABLE I.—TABULATION

MALES

No.	Age	St	Str	Sh	Hmf	A	Hs	Wsh	Lfa	Lh	Bh	Wf	HfI	HfII
1	4	1070	1065	850	385	465	580	260	295	160	144	127	153	91
2	4	910	890	700	340	360	495	230	235	161	138	114	128	81
3	4	950	940	730	330	400	560	230	260	161	133	109	135	80
4	4	850	845	660	300	360	495	215	230	158	133	112	116	73
5	6	990	990	780	350	430	545	240	270	164	137	117	136	84
6	6	1000	980	770	350	420	570	235	265	170	144	117	147	80
7	7	1115	1120	900	405	495	610	260	310	161	135	120	150	84
8	7	1090	1100	840	380	460	610	270	290	169	134	118	134	84
9	7	1125	1130	890	385	505	605	250	310	160	140	117	148	91
10	8	1185	1230	955	410	545	650	275	330	156	147	123	139	91
11	10	1285	1330	1030	450	580	685	325	360	166	150	128	150	94
12	11	1335	1415	1080	440	640	705	345	370	164	146	126	164	102
13	11	1310	1310	1045	460	585	705	330	360	165	147	131	148	93
14	13	1430	1505	1190	510	680	735	345	415	176	134	129	153	102
15	14	1385	1450	1120	490	630	730	355	400	164	149	133	166	100
16	15	1315	1390	1070	455	615	705	315	370	160	139	122	148	93
17	16	1395	1390	1140	510	630	775	335	375	167	151	133	167	108
18	18	1560	1570	1305	610	695	835	365	425	184	149	137	164	103
19	18	1490	1550	1235	550	685	775	370	420	184	148	135	161	103
20	21	1580	1630	1320	580	740	855	420	435	191	155	143	168	106
21	21	1490	1555	1240	570	670	805	355	420	180	149	133	159	102
22	24	1530	1560	1260	560	700	850	390	420	180	144	143	162	107
23	28	1470	1525	1225	555	670	785	430	410	175	147	144	181	117
24	30	1605	1615	1340	625	715	865	395	435	180	151	147	172	109
25	32	1595	1705	1330	600	730	850	440	450	175	158	146	168	110
26	32	1570	1650	1305	570	735	840	380	435	168	147	135	178	113
27	34	1580	1690	1320	570	750	850	420	445	187	152	143	187	118
28	35	1490	1540	1250	560	690	810	360	415	170	136	133	175	111
29	35	1505	1550	1210	535	675	815	390	415	172	144	141	179	115
30	35	1605	1720	1335	580	755	895	420	465	187	146	139	180	118
31	35	1530	1575	1275	575	700	860	410	420	165	146	137	166	113
32	40	1575	1660	1315	575	740	830	395	430	178	143	135	177	122
33	40	1570	1610	1300	600	700	835	410	430	178	161	144	166	112

* Measurements are in millimeters.

OF MEASUREMENTS*

MALES

Hn	Wn	IStr	IA	IHs	IWsh	FI	NI	CI	No.
34	29	99.53	43.45	54.20	24.29	71.66	85.30	90.00	1
31	25	97.80	39.56	54.39	25.27	71.05	80.64	85.71	2
30	22	99.00	42.10	58.88	24.21	73.39	73.33	82.60	3
26	26	99.41	42.35	58.23	25.29	65.17	100.00	84.17	4
30	29	100.00	43.43	55.05	24.24	71.79	96.66	83.53	5
30	29	98.00	42.00	57.00	23.50	68.37	96.66	84.70	6
31	28	100.03	44.39	54.70	23.31	70.00	90.32	83.85	7
32	30	100.92	42.20	55.96	24.77	71.19	93.75	79.30	8
32	28	100.44	44.88	53.77	22.22	77.77	87.50	87.50	9
37	31	103.79	45.99	54.85	23.20	73.98	83.78	94.23	10
36	32	103.05	45.18	53.31	25.29	73.43	88.88	90.36	11
40	31	105.90	47 94	52.81	25.84	80.95	77.50	89.02	12
36	32	100.00	44.65	53.81	25.19	70.99	88.88	89.09	13
43	34	105.24	47.55	51.21	24.12	79.08	79.08	76.15	14
39	36	104.68	45.48	52.71	25.63	75.18	92.30	90.85	15
37	31	105.70	46.76	53.61	23.95	76.22	83.78	86.87	16
44	34	99.72	45.16	55.55	24.01	81.20	77.27	90.42	17
36	33	100.64	44.55	53.52	23.39	75.18	91.66	80.98	18
40	37	104.03	45.97	52.01	24.83	76.30	92.50	80.46	19
43	39	103.17	46.83	54.11	26.58	74.13	90.70	81.15	20
46	37	104.36	44.96	54.03	23.82	76.69	80.43	82.77	21
45	38	101.96	45.75	55.55	25.49	74.85	84.44	80.00	22
52	35	103.74	45.57	53.40	29.25	81.25	67.31	84.00	23
47	33	100.62	44.54	53.89	24.61	74.15	70.21	83.88	24
51	35	106.89	45.76	52.22	27.58	75.34	68.63	90.28	25
46	34	105.09	46.81	53.50	24.20	83.73	73.91	87.50	26
48	38	106.96	47.46	53.80	26.58	82.51	79.17	81.29	27
45	31	103.35	46.30	54.36	24.16	83.45	68.88	80.00	28
50	37	102.99	44.85	54.15	25.91	81.56	74.00	83.72	29
51	42	107.16	47.04	55.70	26.16	84.90	82.35	78.28	30
48	35	102.94	45.75	56.21	26.79	82.48	72.91	88.50	31
49	34	105.39	46.98	52.69	25.07	90.37	69.38	80.33	32
52	41	102.55	44.58	53.18	26.11	77.77	78.84	90.45	33

TABLE I.—TABULATION OF

No.	Age	St	Str	Sh	Hmf	A	Hs	Wsh	Lfa	Lh	Bh	Wf	Hfl	Hfll
MALES														
34	40	1600	1660	1340	580	760	860	405	450	178	158	146	169	117
35	45	1560	1560	1310	615	695	820	405	430	179	148	135	173	111
36	48	1570	1670	1320	570	750	865	425	440	178	148	142	168	107
FEMALES														
37	5	1045	1040	835	375	460	585	255	280	159	145	119	134	87
38	7	990	960	780	370	410	570	235	255	151	140	118	137	84
39	8	1270	1300	1050	460	590	660	300	360	171	140	124	144	85
40	9	1175	1180	930	415	515	640	280	315	167	144	123	145	93
41	9	1120	1120	895	420	475	625	265	295	158	139	120	143	88
42	11	1270	1280	1040	480	560	690	305	335	163	140	122	148	95
43	11	1120	1120	810	410	400	605	275	300	155	144	120	144	82
44	12	1250	1240	1030	480	550	680	295	340	162	140	125	150	96
45	12	1270	1245	1030	480	550	705	310	330	158	137	121	146	94
46	12	1270	1290	1030	460	570	660	290	340	163	142	123	152	96
47	12	1215	1255	975	430	545	650	285	330	160	141	122	140	92
48	12	1260	1280	1030	460	570	695	280	340	173	142	122	143	94
49	14	1390	1450	1145	500	645	740	340	395	169	145	131	155	102
50	20	1435	1470	1160	530	630	765	345	395	173	142	130	154	97
51	25	1435	1420	1180	560	620	780	350	370	162	146	131	159	98
52	28	1500	1515	1260	595	665	825	370	410	170	148	131	158	108
53	30	1510	1550	1260	580	680	810	370	415	170	143	132	156	104
54	30	1495	1505	1225	555	670	830	355	400	178	152	134	160	101
55	30	1425	1505	1180	510	670	760	335	390	172	151	133	164	105
56	35	1440	1470	1180	540	640	750	340	400	169	143	131	171	106
57	35	1535	1540	1270	580	690	830	355	415	173	144	132	163	111
58	35	1460	1510				800			169	144	136	172	106
59	35	1430	1460	1180	530	650	790	370	400	164	151	129	168	112
60	35	1450	1515	1210	550	660	80	370	390	162	144	135	145	94
61	35	1405	1420	1150	520	630	750	325	380	168	138	127	155	92
62	38	1510	1550	1245	565	680	805	370	410	164	150	131	165	108
63	38	1490	1550	1230	550	680	795	365	410	170	150	128	159	105
64	40	1450	1455	1205	575	630	795	355	390	172	148	130	173	118

MEASUREMENTS—*Continued*

Hn	Wn	IStr	IA	IHs	IWsh	FI	NI	CI	No.
MALES									
48	40	103.75	47.50	53.75	25.31	80.13	83.33	88.76	34
44	36	100.00	44.55	52.56	25.96	82.22	81.81	82.68	35
46	37	106.37	47.77	55.09	27.07	75.35	80.43	83.15	36
FEMALES									
34	29	99.60	44.01	55.97	24.40	73.11	85.29	91.19	37
33	29	97.00	41.41	57.57	23.73	71.19	87.87	92.72	38
35	32	102.35	46.45	51.96	23.62	68.62	91.43	81.87	39
36	30	100.35	43.82	54.46	23.82	75.65	83.33	86.23	40
33	28	100.00	42.41	55.80	23.66	73.33	84.84	87.97	41
35	31	100.79	44.09	54.33	24.01	77.87	88.57	85.88	42
38	29	100.00	35.71	54.01	24.55	68.33	76.31	92.90	43
40	30	99.20	44.00	54.40	23.60	76.80	75.00	86.42	44
36	32	98.03	43.30	55.51	24.40	77.68	88.88	86.72	45
39	31	101.57	44.88	51.96	22.83	78.04	79.48	87.11	46
37	29	103.29	44.85	53.49	23.45	75.40	78.37	88.12	47
38	32	101.58	45.23	55.15	22.22	77.04	84.21	82.08	48
43	36	104.32	46.40	53.23	24.46	77.87	83.72	85.79	49
40	30	102.43	43.90	53.31	24.04	74.61	75.00	82.08	50
39	33	98.94	43.20	54.35	24.39	74.81	84.62	90.12	51
46	33	101.00	44.33	55.00	24.66	82.45	71.74	87.06	52
46	36	102.65	45.03	53.64	24.50	78.78	78.26	84.11	53
45	34	100.60	44.81	55.52	23.74	75.37	75.55	85.39	54
44	33	105.61	47.01	53.33	23.50	78.94	75.00	87.79	55
44	31	102.03	44.44	52.08	23.61	80.91	70.45	84.61	56
48	33	100.20	44.95	54.02	23.12	84.09	68.75	83.24	57
40	38	103.42		54.79		77.94	95.00	85.23	58
49	31	102.09	45.45	55.24	25.87	86.85	63.26	92.07	59
41	32	104.48	45.51	55.17	25.51	69.62	78.04	88.88	60
43	33	101.06	44.80	53.38	23.13	72.44	76.74	82.14	61
42	32	102.65	45.00	53.31	24.50	82.50	76.19	91.47	62
44	34	104.02	45.62	53.35	24.49	82.03	77.27	88.23	63
50	36	100.02	43.45	54.82	24.48	90.77	72.00	86.05	64

TABLE I—TABULATION OF MEASUREMENTS —*Concluded*

FEMALES

No.	Age	St	Str	Sh	Hmf	A	Hs	Wsh	Lfa	Lh	Bh	Wf	HfI	HfII
65	40	1445	1510	1200	530	670	790	340	400	158	137	125	165	108
66	45	1520	1545	1265	570	695	820	370	415	172	147	134	147	101
67	45	1440	1445	1170	560	610	770	355	380	164	148	133	157	103
68	50	1480	1550	1250	555	695	790	370	415	168	144	145	134	115
69	50	1430	1495	1160	505	655	775	385	400	173	143	135	155	100
70	60	1460	1490	1210	550	660	790	350	395	163	154	129	169	105

FEMALES

Hn	Wn	IStr	IA	IHs	IWsh	FI	NI	CI	No.
47	32	104.49	46.34	54.63	23.52	86.40	68.0	886.71	65
43	34	101.64	45.67	53.95	24.34	75.37	79.0	785.47	66
43	38	100.35	42.40	53.47	24.65	77.44	88.3	790.25	67
50	35	104.73	46.92	53.37	25.00	85.82	70.0	085.70	68
45	40	104.49	45.76	54.20	26.92	74.07	88.8	882.83	69
46	39	102.05	45.20	54.11	23.97	81.40	84.7	994.48	70

TABLE II

MAXIMUM, MINIMUM, AND AVERAGE MEASUREMENTS, AND INDICES OF ADULTS*

	Males (18 + yrs. of age) Nos. 18–36			Females (18 + yrs. of age) Nos. 50–70		
	Max.	*Min.*	*Aver.*	*Max.*	*Min.*	*Aver.*
St	1605	1470	1551.31	1535	1405	1464.04
Str	1720	1525	1609.73	1550	1420	1498.57
Sh	1340	1210	1291.05	1265	1150	1209.50
Hmf	625	535	577.89	595	505	550.50
A	760	670	713.42	695	610	659.00
Hs	895	775	836.84	830	750	791.42
Wsh	440	355	399.21	385	325	357.25
Lfa	465	410	431.05	415	370	399.00
Lh	191	165	178.36	178	158	168.28
Bh	161	136	148.94	154	137	146.04
Wf	147	133	139.89	136	125	131.42
HfI	187	159	171.73	173	145	161.00
HfII	122	102	111.21	118	92	104.61
Hn	52	36	46.68	50	39	44.52
Wn	42	31	36.42	40	30	34.14
IStr	107.16	100.00	103.78	105.61	98.94	102.33
IA	47.77	44.54	45.97	47.01	42.40	44.98
IHs	56.21	52.01	53.88	55.52	52.08	54.04
IWsh	29.25	23.39	25.73	26.92	23.12	24.39
FI	90.37	74.13	79.59	90.77	69.62	79.65
NI	92.50	67.31	78.46	95.00	63.26	77.00
CI	90.45	78.28	83.58	94.48	82.08	86.85
CI, Children (Nos. 1–17)			86.37	CI, Children Nos. 37–49)		87.30

*Measurements are in millimeters.

TABLE III.—STATURE (St)

Measurements (*cm.*)	Number of individuals	
	Male	Female
140		1
1		
2		1
3		4
4		2
5		3
6		2
7	1	
8		1
9	3	2
150	1	1
1		2
2		1
3	2	1
4		
5		
6	2	
7	4	
8	2	
9	1	
160	3	
No. of cases.....	19	21
Average.....	155.13	146.40

TABLE IV.—STRETCH OF ARMS (Str)

Measurements (*cm.*)	Number of individuals	
	Male	Female
142		2
3		
4		1
5		3
6		1
7		2
8		2
9		
150		2
1		4
2	1	
3		
4	1	2
5	3	2
6	2	
7	2	
8		
9		
160		
1	2	
2		
3	1	
4		
5	1	
6	2	
7	1	
8		
9	1	
170	1	
1		
2	1	
No. of cases.....	19	21
Average.....	160.97	149.86

TABLE V.—HEIGHT OF SHOULDER (ACROMION) (Sh)

Measurements (*cm.*)	Number of individuals	
	Male	Female
115		1
6		2
7		1
8		4
9		
120		2
1	1	2
2	2	1
3	1	1
4	1	1
5	1	1
6	1	3
7	1	1
8		
9		
130	3	
1	2	
2	2	
3	2	
4	2	
No. of cases.....	19	20
Average.....	129.10	120.95

TABLE VI.—HEIGHT OF MIDDLE FINGER FROM SURFACE ON WHICH HEEL RESTS (Hmf)

Measurements (*cm.*)	Number of individuals	
	Male	Female
50		1
1		1
2		1
3	1	3
4		1
5	2	5
6	2	3
7	6	2
8	3	2
9		1
60	2	
1	2	
2	1	
No. of cases.....	19	20
Average.....	57.79	55.05

TABLE VII.—LENGTH OF ARM (A)

(Acromion to Tip of Second Finger)

Measurements (*cm.*)	Number of individuals	
	Male	Female
1		1
2		1
3		3
4		1
5		2
6		3
7	3	3
8	1	3
9	3	3
70	3	
1	1	
2		
3	2	
4	2	
5	3	
6	1	
No. of cases.....	19	20
Average.....	71.34	65.90

TABLE VIII.—HEIGHT SITTING (Hs)

Measurements (*cm.*)	Number of individuals	
	Male	Female
75		2
6		2
7	1	2
8	1	1
9		6
80	1	3
1	2	1
2	1	2
3	3	2
4	1	
5	4	
6	4	
7		
8		
9	1	
No. of cases.....	19	21
Average.....	83.68	79.14

TABLE IX.—WIDTH OF SHOULDERS BETWEEN ACROMIA (Wsh)

Measurements (*cm.*)	Number of individuals	
	Male	Female
32		1
3		1
4		3
5	1	6
6	2	1
7	1	7
8	1	1
9	4	
40	2	
1	2	
2	4	
3	1	
4	1	
No. of cases.....	19	20
Average.....	39.92	35.72

TABLE X.—LENGTH OF FOREARM (Lfa)
(Elbow to tip of middle finger)

Measurements (*cm.*)	Number of individuals	
	Male	Female
37		1
8		2
9		5
40		5
1	3	7
2	5	
3	6	
4	2	
5	2	
6	1	
No. of cases.....	19	20
Average.....	43.10	39.90

TABLE XI.—LENGTH OF HEAD—(Lh)

Measurements (*mm.*)	Number of individuals	
	Male	Female
158		1
9		
160		
1		
2		2
3		1
4		3
5	1	
6		
7		
8	1	2
9		2
170	1	3
1		
2	1	3
3		3
4		
5	2	
6		
7		
8	4	1
9	1	
180	3	
1		
2		
3		
4	2	
5		
6		
7	2	
8		
9		
190		
1	1	
No. of cases.....	19	21
Average.....	178.36	168.28

TABLE XII.—WIDTH OF HEAD (Bh)

Measurements (*mm.*)	Number of individuals	
	Male	Female
136	1	
7		1
8		1
9		
140		
1		
2		1
3	1	3
4	2	4
5		
6	2	1
7	2	1
8	3	3
9	2	
150		2
1	1	2
2	1	1
3		
4		1
5	1	
6		
7		
8	2	
9		
160		
1	1	
No. of cases.....	19	21
Average.....	148.94	146.04

TABLE XIII.—WIDTH OF FACE BETWEEN ZYGOMATIC ARCHES (Wf)

Measurements (*mm.*)	Number of individuals	
	Male	Female
125		1
6		
7		1
8		1
9		2
130		2
1		4
2		2
3	2	2
4		3
5	4	2
6		1
7	2	
8		
9	1	
140		
1	1	
2	1	
3	3	
4	2	
5		
6	2	
7	1	
No. of cases.....	19	21
Average.....	139.89	131.42

TABLE XIV.—DISTANCE FROM HAIR LINE TO CHIN (HfI)

Measurements (*mm.*)	Number of individuals	
	Male	Female
145		1
6		
7		1
8		
9		
150		
1		
2		
3		
4		1
5		2
6		1
7		1
8		1
9	1	2
160		1
1	1	
2	1	
3		1
4	1	1
5		2
6	2	1
7		
8	3	1
9	1	1
170		
1		1
2	1	1
3	1	1
4		

TABLE XIV.—*Continued*

Measurements (*mm.*)	Number of individuals	
	Male	Female
5	1	
6		
7	1	
8	1	
9	1	
180	1	
1	1	
2		
3		
4		
5		
6		
7	1	
No. of cases.....	19	21
Average.....	171.73	161.00

TABLE XV.—DISTANCE FROM NASION TO CHIN (HfII)

Measurements (*mm.*)	Number of individuals	
	Male	Female
92		1
3		
4		1
5		
6		
7		1
8		1
9		
100		1
1		2
2	1	
3	2	1
4		1
5		3
6	1	2
7	2	
8		3
9	1	
110	1	
1	2	1
2	1	1
3	2	
4		
5	1	1
6		
7	2	
8	2	1
9		
120		
1		
2	1	
No. of cases.....	19	21
Average.....	111.21	104.61

TABLE XVI.— HEIGHT OF NOSE (Hn)

Measurements (*mm.*)	Number of individuals	
	Male	Female
36	1	
7		
8		
9		1
40	1	2
1		1
2		1
3	1	3
4	1	3
5	2	2
6	3	3
7	1	1
8	3	1
9	1	1
50	1	2
1	2	
2	2	
No. of cases.....	19	21
Average.....	46.68	44.52

TABLE XVII.—WIDTH OF NOSE BETWEEN ALÆ (Wn)

Measurements (*mm.*)	Number of individuals	
	Male	Female
30		1
1	1	2
2		3
3	2	5
4	2	3
5	3	1
6	1	2
7	4	
8	2	2
9	1	1
40	1	1
1	1	
2	1	
No. of cases.....	19	21
Average.....	36.42	34.14

TABLE XVIII.—(IStr)

Index	Number of individuals			
	Men	Boys	Women	Girls
97				1
8		1		1
9		3	1	1
100	1	6	3	4
1	2	1	3	1
2	1		5	3
3	5	1	3	1
4	4	1	4	1
5	2	2	1	
6	1	2	1	
7	3			
No. of cases.....	19	17	21	13
Average.....	103.78	101.37	102.33	100.62
Average (Nos. 5–17).....		102.11		

TABLE XIX.—(IHs)

Index	Number of individuals			
	Men	Boys	Women	Girls
51		1		
2	2		1	2
3	5	3	7	3
4	8	5	6	3
5	1	4	6	2
6	3	1	1	2
7		1		1
8		1		
9		1		
No. of cases	19	17	21	13
Average	53.88	54.71	54.04	54.46
Average (Nos. 5–17)		54.18		

TABLE XX—(IWsh)

Index	Number of individuals			
	Men	Boys	Women	Girls
22		1		
3	1	4	4	1
4	3	5	10	2
5	5	5	3	9
6	4	2	2	1
7	4		1	
8	1			
9	1			
No. of cases	19	17	20	13
Average	25.73	23.78	24.39	23.59
Average (Nos. 5–17)		24.25		

TABLE XXI.—(Ia)

Index	Number of individuals			
	Men	Boys	Women	Girls
36				1
7				
8				
9		1		
40				
1				1
2		4	1	
3		2	2	2
4		1	3	4
5	6	5	7	3
6	6	1	5	2
7	6	1	2	
8	1	2		
No. of cases	19	17	20	13
Average	45.97	44.29	44.98	43.58
Average (Nos. 5–17)		45.04		

TABLE XXII.—FACIAL INDEX (FI)

Index	Number of individuals			
	Men	Boys	Women	Girls
65		1		
6				
7				
8		1		1
9				1
70		1	1	
1		3	1	1
2		2		
3		2		2
4	2	1	1	
5	4	1	4	1
6	1	1		1
7	1		1	2
8	1	1	1	
9		1	2	
80	1			
1	1	2	2	
2	3		2	
3	1		1	
4	2		1	
5	1			
6			2	
7			1	
8				
9				
90	1			
1			1	
No. of cases	19	17	21	13
Average	79.59	73.61	79.65	74.69
Average (Nos. 5–17)		74.63		

TABLE XXIII.—NASAL INDEX (NI)

Index	Number of individuals			
	Men	Boys	Women	Girls
63			1	
4				
5				
6				
7	1			
8			1	
9	3		1	
70	1		2	
1				
2			2	
3	1	1		
4	2			
5			2	1
6			2	1
7		2	2	
8			2	1
9	2	1	1	1
80	2			
1		1		
2	2			
3	1			1
4	1	2		2
5		1	2	2
6				
7		1		
8			1	2
9		2	1	1
90		1		
1	1			1

TABLE XXIII.—*Continued*

Index	Number of individuals			
	Men	Boys	Women	Girls
2	2	1		
3				
4		1		
5			1	
6				
7		2		
8				
9				
100		1		
No. of cases	19	17	21	13
Average	78.46	86.80	77.00	83.64
Average (Nos. 5–17)		87.41		

TABLE XXIV.—CEPHALIC INDEX (CI)

Index	Number of individuals			
	Men	Boys	Women	Girls
76		1		
.5				
7				
.5				
8				
.5				
9				
.5		1		
80	2			
.5	2			

TABLE XXIV.—*Continued*

Index	Number of individuals			
	Men	Boys	Women	Girls
1	2			
.5	1			
2			2	2
.5	2	1		
3	1		2	
.5	1	1		
4	2	2	1	
.5		1	1	
5			1	
.5		1	3	
6			1	3
.5				1
7		1	1	2
.5	1	1	1	
8			2	2
.5	2			
9	1	2	1	
.5				
90		1	2	
.5	2	2		
1		1		1
.5			1	
2			1	
.5				
3				2
.5				
4		1		
.5			1	
No. of cases	19	17	21	13
Average	83.58	86.37	86.85	87.30
Average (Nos. 5–17)		86.04		
No. Mesocephalic	10	3	4	2
No. Brachycephalic	9	14	17	11

TABLE XXV.—TABLE OF RELATIONSHIPS

f	= father	g f	= grandfather
m	= mother	g m	= grandmother
so	= son	g so	= grandson
d	= daughter	g d	= granddaughter
br	= brother	h	= husband
si	= sister	w	= wife

1 = so of 34, 57; br of 13, 14, 44, 49.
2 = so of 23, 52; br of 37.
3 = so of 36, 66; br of 20, 39.
4 = (name, Sapo)
5 = br of 9, 43.
6 = (name, Yukito)
7 = so of 35, 56.
8 = so of 30, 60.
9 = so of 29, 61; br of 5, 43.
10 = so of 33, 63; br of 19, 21. (name, Pablo)
11 = so of 62; g so of 68; br of 15; h of 55.
12 = so of 59.
13 = so of 34, 57; br of 1, 14, 44, 49.
14 = so of 34, 57; br of 1, 13, 44, 49.
15 = so of 62; g so of 68; br of 11.
16 = so of 32, 65; br of 47.
17 = so of 67; br of 31, 45. (name, Jenaro)
18 = (name, Pipa)
19 = so of 33, 63; br of 10, 21. (name, Bellisario)
20 = so of 36, 66; br of 3, 39.
21 = so of 33, 63; br of 10, 19; h of 50. (name, Juan)
22 = h of 51. (name, Pehla'sa)
23 = f of 2, 37; h of 52. (name, Pīwañtcītcīos Barfīkī)
24 = so of 68; br of 62, 59; f of 40. (name, Juan Vicente)
25 = h of 53. (name, José Lisandro)
26 = br of 46. (name, Antonio Tamonero)
27 = h of 58.
28 = br of 29.
29 = h of 61; f of 9, 43; br of 28. (name, Chibu)
30 = f of 8; h of 60. (name, Antonio Nyapa)
31 = so of 67; br of 17, 45; f of 42, 48. (name, Ramón Pichota)

TABLE XXV.—*Continued*

32 = h of 65; f of 16, 47.
33 = h of 63; f of 10, 19, 21. (name, José Trejo)
34 = h of 57; f of 1, 13, 14, 44, 49. (name, Rosendo)
35 = f of 7; h of 56. (name, Sylvester)
36 = h of 66; f of 3, 20, 39. (name, Manuel Sanfīkī)
37 = d of 23, 52; si of 2.
38 = si of 41.
39 = d of 36, 66; si of 20, 3.
40 = d of 24; g d of 68.
41 = si of 38.
42 = d of 31; si of 48.
43 = d of 29, 61; si of 5, 9.
44 = d of 34, 57; si of 1, 13, 14, 49.
45 = d of 67; si of 31, 17.
46 = si of 26.
47 = d of 65, 32; si of 16.
48 = d of 31; si of 42.
49 = d of 34, 57; si of 1, 13, 14, 44.
50 = w of 21.
51 = w of 22.
52 = w of 23; m of 2, 37
53 = w of 25.
55 = w of 11.
56 = w of 35; m of 7.
57 = w of 34; m of 1, 13, 14, 44, 49.
58 = w of 27.
59 = m of 12; si of 24.
60 = w of 30; m of 8.
61 = w of 29; m of 9, 43.
62 = w of 68; m of 11, 15; si of 24.
63 = w of 33; m of 10, 19, 21.
65 = w of 32; m of 47, 16.
66 = w of 36; m of 3, 20, 39.
67 = m of 17, 31, 45. (name, María)
68 = m of 24, 62; g m of 11, 15, 40.

NUMERAL SYSTEM

The notes on and analysis of Cayapa numerals here given were made the subject of a short contribution to the *Putnam Anniversary Volume*, 1909, in which they appear under the title of "The Cayapa Numeral System." They are based on the accompanying table of numbers, which runs to 10,000. Only one informant could carry the count above a few thousands, but there seems no doubt that the higher thousands here given are correct.

The Cayapa numeral system is a quinary-decimal-centenary one with certain variations, to be noted later, and the rules on which it is based are well fixed and regular. In it there are certain points of special interest. One of these is its centenary nature, according to which there is no separate term for thousand; but hundred is used as the base of all numbers from 100 up, thus making a number like 4000 forty hundreds, not four thousands.

Also, there appear two terms which show what may be regarded as traces of other systems, though on account of the lack of other terms in support of these systems, they must be treated as only possibilities. Four is formed on the base two, thus showing what may be a trace of a binary system; but this is the only evidence of such a system found in the whole series of numbers. Especially significant in considering this term is the fact that three exists independently of two, and thus points strongly to a system higher than the binary. The second extraneous term is twenty, which appears entirely unrelated to any of the other numbers, either lower or higher. This might be taken as a trace of a system of

vigesimal nature, but it lacks even so much support as four, and the binary system for it has not even one other number of a form in any way resembling it. On the other hand, though two other terms of the system are held in common with a neighboring language, the terms for four and twenty do not show this indication of possible borrowing either by one people or the other.

An unusual feature here shown is the use of two distinct terms for the same number in two different parts of the system. This occurs in ten, where *pa'it'a* is used up to nineteen; and *tcū'ñga*, apparently a borrowed term, from thirty up.

The order given to the figures of the various denominations is as follows:

All compound numbers from ten up which contain a figure of the units order have this as the final term. Thus thirteen is ten three. The numbers six to nine are compounds of five with the four lower numbers. Here the same rule is followed and the numbers one to four are terminal.

In all tens and in all hundreds, which in this system include the thousands also, the term tens or hundreds is the final one, being preceded by the number of tens or hundreds in the numeral in question. Thus 40 is four tens, 400 is four hundreds, and 4000 is forty hundreds.

In no case is there found anything in the nature of a connective term between the parts of a compound number.

Following the phonetic laws of the language, certain terms, if not used as the ultimate ones, are changed when they occur in a compound numeral. Thus *pē'ma*

is the unit three, and *pa'it·a pēma* is thirteen, but *pē'ñ tcūñga* is thirty. So far as two and three are concerned, the change is regular and universal. One changes in the hundreds place in the numerals one hundred to one hundred ninety-nine, and in six when this occurs as a terminal figure. Five has three forms. According to these phonetic laws also, these numbers, when occurring in units or in the units place, undergo the same changes if followed by other terms possessing the necessary sounds. Thus, in the sentence "he has three new ollas," *ya-tcī kasa pē'n pīa'ma hū*^{n}, literally "his new three ollas has," the change of form of the numeral is necessary. Equally correct, however, is *ya-tcī kasa pıa'ma pēma hū*^{n}, in which the surrounding sounds do not necessitate the change. It appears also that the numbers two and three, and perhaps one and five, may exert an influence upon the term following, as in the cases of *pa'i patsa* and *pē'ñ batsa*, in which the change of the second term would seem to be related to the preceding sounds.

Rules of Composition

The numbers on which the Cayapa numeral system is based are 1, 2, 3, 5, 10, 20, and 100. On these the composition proceeds as follows:

Four is *ta*-2.

Six to nine are 5-*dic* 1, 2, 3, and 4 respectively.

Ten alone and as a component of the numbers 11 to 19 and other higher numbers in which these occur is *pa'it·a*, a term quite different from tens (*tcū'ñga*) used

in the composition of the tens from 30 up and in all higher numbers in which these occur.

Beginning with 11 all units proceed regularly by the simple addition of the unit terms 1 to 9 to the particular ten under consideration.

Twenty has a name which, unlike the other tens, is not related in any way to the units.

Beginning with 30 all the tens proceed regularly by the addition of *tcū'ñga* to the unit terms 3 to 9, with certain changes in some of these terms, as elsewhere noted.

Hundred is the last grand division, and all the higher numbers are simply the term hundred preceded by the term indicating the number of hundreds in the particular numeral.

Basal Numbers

One occurs as a basal number in the following: In 1 where it is rendered *ma'iñ*; in 6, where it is rendered *ma'lyō*; and in 100, where it is rendered *mam*, and in all higher numbers containing one of these in composition. In the accompanying table of numerals these three forms occur in the following numbers:

ma'iñ occurs in 1, 11, 21, 60, 101, 600, 1100, 1600, 2100, and 6000*
ma'lyō occurs in 6 and 16
mam occurs in 100, 101, 110, 120, and 10000.

Two occurs as a basal number in the following: in 2, 4, 7, and 9, in all of which it is rendered *pa'lyō*. It is

* While 1 in the composite number 6 is rendered *ma'lyō*, this is true only where 6 is the terminal figure in the higher composite numbers. In all other cases it is rendered *ma'iñ*.

also rendered *pa'lyō*, if in the units place, in all higher numbers in which any of these four occur. If, however, they appear in the tens or a higher column, 2 becomes *pai*, as is the case in ordinary sentence structure; for instance, *pai kū'tca*, two dogs. An exception appears in 20 and 2000, since 20 is rendered by a term, *ma'n-tcalōra*, entirely unrelated to any of the other numbers and also since the system proceeds strictly on a centenary basis from 100 up.

In the accompanying table these two forms occur as follows:

pa'lyō occurs in 2, 4, 7, 9, 12, 14, 17, and 19.
pai occurs in 40, 70, 90, 200, 400, 700, 900, 1200, 1400, 1700, 1900, 2200, 4000, 7000, and 9000.

Three occurs as a basal number in 3 and 8, in both of which it is rendered *pē'ma*, and in all higher numbers which contain either of these. In all cases in which either occurs in the units column it retains its original unit form given above. Wherever it occurs in the tens or in a higher column its form is changed to *pēñ*, here again following the ordinary phonetic rules. These two forms are here found in the following numbers:

pē'ma in 3, 8, 13, and 18.
pēñ in 30, 80, 300, 800, 1300, 1800, 3000, and 8000.

Five is used as a basal number as follows: in 5, where it is rendered *ma'n-da*, and 6, 7, 8, and 9, in all of which it is rendered *ma'n-dic*, and in all higher numbers in which these occur. In the higher numbers where 5 appears in any of the columns from the tens up, its

form is *mañ*. Though 5 appears in the units as *ma'n-da*, it would seem, when its other forms are considered, that this is really a compound and that its simplest form is *man* or *mañ*. As with the lower numbers, in all cases in which 5 appears in the units column, it retains its unit form, but in all other cases it is changed. Since the system is in part of quinary one, 6 begins the second set or group, and 6, 7, 8, and 9 are composed of 5, with 1, 2, 3, and 4, respectively, added. In these the term 5 takes the form *ma'n-dic*, probably *ma'n-da-ic* in full. In this form it occurs in all the higher numbers in which 6, 7, 8, and 9 appear. As above stated, in any of the higher numbers in which 5 itself appears in any of the columns above the units, it has the form *mañ*, which is the same rendition that it has in a sentence when followed by such a term as *ya* or *kū'tca*, as *ma'ñ ya*, five houses, or *ma'ñ kūtca*, five dogs. In the list of numerals the three forms occur as follows:

ma'n-da occurs in 5 and 15.
ma'n-dic occurs in 6, 7, 8, 9, 16, 17, 18, 19, 60, 70, 80, 90, 600, 700, 800, 900, 1600, 1700, 1800, 1900, 6000, 7000, 8000, and 9000.
mañ occurs in 50, 500, 1500, and 5000.

Ten occurs as a basal number as follows: in the numbers 10 to 19, inclusive, where it is rendered *pa'it'a*, and in the higher numbers in which any one of these appears. This term ten is quite a different one from tens, *tcū'ñga*, which is used in the numbers from 30 up. This unusual use of a term for tens which is entirely distinct from the simple 10 appears to be explainable through borrowing, since in a neighboring

language, the Quichua,* both 10 and tens are rendered *tcū'ñga*, though the cause of such borrowing, if such it is, remains uncertain. These two terms appear in the accompanying list as follows:

pa'it a appears in 10 to 19 inclusive, and in 1000 to 1900 inclusive.

tcū'ñga appears in 30 to 90 inclusive, and in 3000 to 9000 inclusive.

Twenty, *ma'ntcalōra*, one of the two exceptions to the regularity of this numeral system, appears as a basal number in 20 and in all higher numbers in which it, as such, occurs. In the accompanying list

ma'ntcalōra appears in 20, 21, 120, 2000, 2100, and 2200.

Hundred, *pa'tsa* or *ba'tsa*, depending on its phonetic surroundings, forms the base of all numbers from 100 up. This includes the thousands also, since the system is centenary above 100. Thus, 8000 is not eight thousands but eighty hundreds.

* There is in Cayapa no nominal plural, hence *tcūñga* and *ba'tsa* are both singular and plural so far as form is concerned. The former, not being the term used for 10, is really used only in a plural sense, but the latter is used as both singular and plural. Further, the term *tcū'ñga* is, according to a short Quichua vocabulary obtained from a couple of informants temporarily on the Rio Cayapas, the regular term ten in that language and is used throughout their entire system. The term hundred has also a close parallel, *pa'tsak*, in Quichua, but, while Cayapa has a strict centenary system above 100, Quichua carries the hundreds only as far as 1000, which is *wara'ñga*, a term entirely unrelated to hundred.

pa'tsa or *ba'tsa* appears here in 100, 101, 110, 120, 200 to 2200 inclusive and 3000 to 10000 inclusive.

	Cayapa Numerals	Analysis
1	*maiñ*	1*
2	*pa'lyō*	2
3	*pē'ma*	3
4	*ta'l-palyō*	*tal*-2
5	*ma'n-da*	5-*da*
6	*man-dic ma'lyō*	5-*dic* 1
7	*man-dic pa'lyō*	5-*dic* 2
8	*man-dic pē'ma*	5-*dic* 3
9	*man-dic ta'l-palyō*	5-*dic* *tal*-2
10	*pa'iṭ'a*	10
11	*pa'iṭ'a ma'iñ*	10 1
12	*pa'iṭ'a pa'lyō*	10 2
13	*pa'iṭ'a pē'ma*	10 3
14	*pa'iṭ'a ta'l-palyō*	10 *tal*-2
15	*pa'iṭ'a ma'n-da*	10 5-*da*
16	*pa'iṭ'a ma'n-dic malyō*	10 5-*dic* 1
17	*pa'iṭ'a ma'n-dic palyō*	10 5-*dic* 2
18	*pa'iṭ'a ma'n-dic pēma*	10 5-*dic* 3
19	*pa'iṭ'a man-dic ta'l-palyō*	10 5-*dic* *tal*-2
20	*ma'ntcalōra*	20
21	*ma'ntcalōra ma'iñ*	20 1
30	*pē'ñ tcū'ñga*	3 tens [See pp. 453-54]
40	*ta'l-pai tcūñga*	*tal*-2 tens
50	*ma'ñ tcūñga*	5 tens
60	*man-dic ma'iñ tcūñga*	5-*dic* 1 ten
70	*man-dic pa'i tcūñga*	5-*dic* 2 tens
80	*man-dic pē'ñ tcūñga*	5-*dic* 3 tens
90	*man-dic ta'l-pai tcūñga*	5-*dic* *tal*-2 tens
100	*mam ba'tsa*	1 hundred
101	*mam batsa ma'iñ*	1 hundred 1
110	*mam batsa pa'iṭ'a*	1 hundred 10
120	*mam batsa ma'ntcalōra*	1 hundred 20

* So far all efforts to reduce these terms to tangible objects such as are often used by primitive peoples in counting have not met with success.

	Cayapa Numerals	Analysis
200	*pai pa'tsa*	2 hundreds
300	*pēñ ba'tsa*	3 hundreds
400	*tal-pai pa'tsa*	*tal*-2 hundreds
500	*mañba'tsa*	5 hundreds
600	*man-dic ma'iñ batsa*	5-*dic* 1 hundreds
700	*man-dic pa'i patsa*	5-*dic* 2 hundreds
800	*man-dic pē'ñ batsa*	5-*dic* 3 hundreds
900	*man-dic ta'l-pai patsa*	5-*dic* tal-2 hundreds
1000	*pa'iṭ'a patsa*	10 hundreds
1100	*pa'iṭ'a ma'iñ batsa*	10 1 hundreds
1200	*pa'iṭ'a pa'i patsa*	10 2 hundreds
1300	*pa'iṭ'a pē'ñ batsa*	10 3 hundreds
1400	*pa'iṭ'a ta'l-pai patsa*	10 *tal*-2 hundreds
1500	*pa'iṭ'a ma'ñ batsa*	10 5 hundreds
1600	*pa'iṭ'a man-dic ma'iñ batsa*	10 5-*dic* 1 hundreds
1700	*pa'iṭ'a man-dic pa'i patsa*	10 5-*dic* 2 hundreds
1800	*pa'iṭ'a man-dic pē'ñ batsa*	10 5-*dic* 3 hundreds
1900	*pa'iṭ'a man-dic ta'l-pai patsa*	10 5-*dic* *tal*-2 hundreds
2000	*ma'ntcalōra patsa*	20 hundreds
2100	*mantcalōra ma'iñ batsa*	20 1 hundreds
2200	*mantcalōra pa'i patsa*	20 2 hundreds
3000	*pē'ñ tcūñga patsa*	3 tens hundreds
4000	*ta'l-pai tcūñga patsa*	*tal*-2 tens hundreds
5000	*ma'ñ tcūñga patsa*	5 tens hundreds
6000	*man-dic ma'iñ tcuñga patsa*	5-*dic* 1 tens hundreds
7000	*man-dic pa'i tcūñga patsa*	5-*dic* 2 tens hundreds
8000	*man-dic pē'ñ tcūñga patsa*	5-*dic* 3 tens hundreds
9000	*man-dic ta'l-pai tcūñga patsa*	5-*dic* *tal*-2 tens hundreds
10000	*ma'm batsa patsa*	1 hundred hundreds

A SYSTEM OF MNEMONIC WRITING

As has already been noted, the Cayapa have no written language and express nothing in writing of any kind. An interesting example of the power of adaptation, however, was given by one individual along this line. The incident, while it has no direct bearing on the general life and culture of the tribe as a whole, may perhaps be significant and of interest when the general subject of mnemonics and hieroglyphic writing is considered, for it shows how readily a single individual of a tribe may borrow a principle which is entirely foreign to the culture of his own people and, with this as a basis, may invent a new system which might give rise to an entirely new order of things if it were carried to its full possibilities. Furthermore, this system is of considerable interest from a phonetic point of view, since it shows that it is founded on strictly phonetic considerations and thus shows what may be termed the natural tendency of the mind of man to correlate and arrange at least some linguistic ideas along logical, phonetic lines.

On the arrival of the author in the Cayapa country he took up his residence with a prominent official of the tribe known, according to the present-day Spanish terminology, as "El Secretario del Gobernacion." When the author expressed a desire to learn the Cayapa language, his host manifested an equal desire to learn English. It was therefore mutually agreed that each should instruct the other. A beginning was made with the numeral system, the author being given the names of the Cayapa numerals. As the terms were pronounced,

careful record of them was made in writing. However, when the Secretario was told the English numerals, he was entirely dependent on his memory, since no system of writing was known to him. On the following day, when each endeavored to recite his lesson to the other, the Secretario was greatly surprised to hear the author read from his notes and correctly pronounce the Cayapa numerals told him the day before, whereas he, on the other hand, had much difficulty in getting his pronunciation correct and in remembering certain of the English numerals. He asked the author how it was possible to remember these numbers and the pronunciation of them; and upon being told about the aid to the memory given by the writing, he was immediately desirous of trying such a plan himself. Being provided with pencil and paper, he thereupon carefully recorded the first ten of the accompanying set of mnemonic characters (fig. 29). With this paper before him he was able, on the following day, to the author's surprise, to recount with almost perfect exactness these first ten English numerals. A day or two more added another set, and in the course of about a week he had worked out a complete system of mnemonic characters for the numerals from one to one hundred. Furthermore, an interesting feature of this set of mnemonic characters is the fact that they are strictly decimal in their composition, whereas the Cayapa numerals form a much more complex system, it being quinary-decimal-centenary.

The units themselves appear to be entirely unrelated one to another, and as the author watched the Indian making these characters it was evident that a pure proc-

ess of invention was evolving in his mind, his chief desire being in each instance to get some character that

Fig. 29.—Mnemonic characters

should represent the particular number and which should be different from all the others.

In forming most of the characters to represent the

numbers from eleven to nineteen he took carefully into account those representing the units one to nine. In fact, he always referred to these and in most cases reproduced them entirely, or in part, as portions of the characters representing the 'teens. Indeed the characters representing fourteen to nineteen are clearly and obviously these same unit characters with the addition of the crowfoot beneath, which represented to his mind the idea of 'teen—not that it was related to ten, but the crowfoot actually represented to him the sounds comprising 'teen. It is even more evident in thirteen, where the crowfoot first appears but where the unit character for three is not present, that the various parts of these characters actually represented to his mind sounds, rather than precisely correlated ideas of the numeral system. This became clear whenever he used this table of characters, for when he first repeated these numbers he did so very slowly and pointed to the particular part of the character which represented the sound which he was speaking. For instance, in the case of fourteen he would point to the square enclosing the circle and say "four;" then his pencil would go down to the crowfoot and he would say "teen." Likewise in nineteen the oval was nine and the crowfoot 'teen. As still further evidence of the phonetic nature of these mnemonic characters, eleven and twelve are excellent examples. To our minds eleven and twelve belong logically to the set of 'teens, though "'teen" does not appear in them. To the Cayapa's mind, however, the vertical line with the four dots on each side in the sign for eleven represented "e," and the oval with its heavy crescent above

represented "leven." Likewise, in the case of twelve, the oval with the crescent on the side represented "two," and the vertical line with the four dots on the left represented "helve." Furthermore, he learned this number not as twelve but as "two-helve," and no amount of correction at any later time could change his pronunciation. In both of these instances we have a composition of the character along strictly phonetic lines. In the higher numbers a similar condition prevailed, though in many instances the same sound or set of sounds was represented by different characters. For instance, the "ty" in the higher tens was variously represented. In fifty it was the long heavy curved line, in sixty the crowfoot, and eighty the dot. In each instance this character forms the lower part of these respective characters. In seventy it was the vertical line, and in thirty the crowfoot, which form in these instances the upper part of the character. Forty and ninety are simply four and nine somewhat altered.

As above mentioned, the idea of the addition of ten to the unit in the numbers eleven to nineteen is indicated by joining directly to the characters one to nine certain other characters representing the sounds, not the idea, expressed in "teen." Likewise also in the numbers twenty-one to twenty-nine. The upper part of the character twenty is joined directly to the unit character and forms an integral part of it. From thirty onward, however, a different method was used. Here the unit character was placed directly after the character representing the particular ten which was being used, thus requiring two independent characters instead of one

composite character to represent any particular number. This arrangement of the characters may have been more or less due to the fact that the inventor had seen the English numbers and had had these explained to him. His arrangement of these may possibly have been influenced by the arrangement of the English, and the fact that the lower numbers were not arranged in a similar manner may be because when he invented them he did not thoroughly comprehend this arrangement of the English.

In the accompanying set of these characters it will be observed that in large measure the tens are formed on the units as bases. There are, however, certain exceptions to this rule. For instance, ten, twenty, and thirty are evidently formed independently without taking the numbers one, two, and three into consideration. The remainder of the tens, however, from forty to ninety inclusive, are palpably formed directly from the units four to nine inclusive by the simple addition of some extra stroke or by the alteration of the unit character.

In view of the above-mentioned phonetic nature of this whole system it appears natural that these three numbers, ten, twenty, and thirty, should be different from their corresponding units, since the sounds involved in these three are very different from the sounds involved in the same units. Attention should be called also to the fact that the character thirty strongly resembles thirteen and that to the informant's mind the upper branching portion of the character thirteen represented the portion of this numeral which we pronounce 'thir," while the crowfoot below represented "teen," and that likewise

the very similar lower portion of the character thirty represented the same sound "thir" while the crowfoot above it represented "ty."

It is therefore evident that, while this set of characters is strictly mnemonic in its use, it is formed on a phonetic basis. It is, as first stated, the original invention of a single individual and in no way represents a tribal characteristic, but with it at hand this individual appeared to be greatly assisted in his difficult task of learning to count in English, and so assiduously did he study his system that in the course of a short time he was able to count fluently from one to one hundred. For a considerable length of time he was unable to do this without the aid of his set of numeral characters, but ultimately, of course, he became so familiar with this that he repeated them easily from memory.

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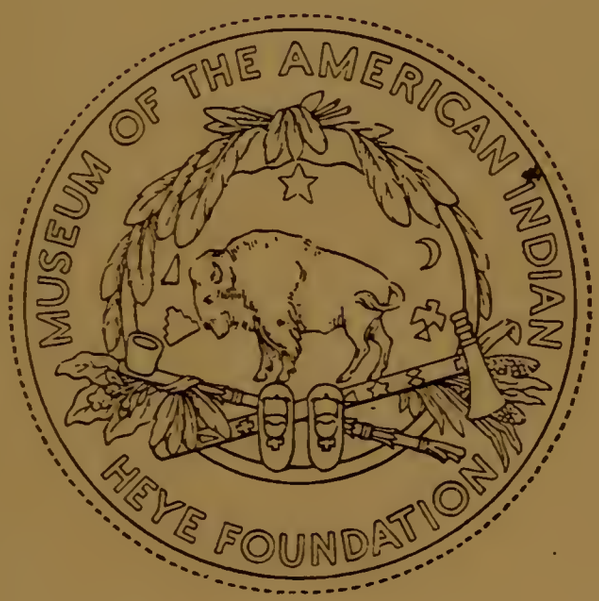

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